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November 29, 2017

678601.ET.01

Karen Kirchner
Superfund Division
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3590

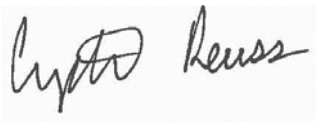
Dear Ms. Kirchner:

Subject: Final Soil Gas and Vapor Intrusion Investigation Technical Memorandum
Southeast Rockford Groundwater Contamination Superfund Site
WA No. 200-TATA-05DK, Contract No. EP-S5-06-01

CH2M HILL, Inc. (CH2M) is pleased to submit the final Soil Gas and Vapor Intrusion Investigation Technical Memorandum for the Southeast Rockford Groundwater Contamination Superfund Site in Rockford, Winnebago County, Illinois. This document has also been provided to Brian Conrath (Illinois EPA) as indicated below. If you have any questions, please contact me at 414-847-0264.

Sincerely,

CH2M HILL, Inc.



Crystal Reuss
Project Manager

Enclosure: Final Soil Gas and Vapor Intrusion Investigation Technical Memorandum, Southeast Rockford Groundwater Contamination Superfund Site (1 hard copy and 2 CDs [1CD is redacted])

c: Brian Conrath, Illinois EPA (1 hard copy and 1 CD)
Daniel Olsson, CO/EPA Region 5 (w/o enclosure)
Mike Dunneback, CS/EPA Region 5 (w/o enclosure)
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Tim Watkins, DPM/CH2M, Detroit (w/o enclosure)
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Cherie Wilson, AA/CH2M, Milwaukee (w/o enclosure)

TECHNICAL MEMORANDUM

Soil Gas and Vapor Intrusion Investigations Southeast Rockford Groundwater Contamination Superfund Site WA No 200-TATA-05DK/Contract No. EP S5-06-01

PREPARED FOR: U.S. Environmental Protection Agency (EPA)

PREPARED BY: CH2M HILL, Inc. (CH2M)

DATE: November 29, 2017

Introduction

This technical memorandum documents the activities associated with the 2016 and 2017 soil gas and vapor intrusion investigations conducted at the Southeast Rockford Groundwater Contamination Superfund Site (site). The purpose of the soil gas investigation was to continue the evaluation of site contaminants in soil gas to identify the potential for vapor intrusion impacts to properties within the investigation area. The purpose of the vapor intrusion investigations was to determine if the vapor intrusion pathway is complete and significant (that is, causing indoor air concentrations to exceed regulatory target levels) at properties identified in the 2014/2015 and 2016 soil gas investigations. The investigations were conducted for EPA under Work Assignment No. 200-TATA-05DK, Contract No. EP S5-06-01.

The Fourth Five-Year Review Report for the site (EPA 2013) identified the need for evaluation of potential indoor vapor intrusion risks for people living or working above the groundwater contamination plume and recommended deep soil gas sampling. Soil gas investigations were completed in 2014 and 2015 by CH2M. Based on the 2014 and 2015 investigation findings, it was concluded that additional investigation of the potential for vapor intrusion was necessary in three areas where site-specific volatile organic compounds (VOCs) were measured in soil gas above EPA vapor intrusion screening levels (VISLs) (CH2M 2016a).

In 2016, a soil gas investigation was performed at one of the three areas identified for additional investigation based on the 2014 and 2015 investigation results. Two rounds of exterior soil gas sampling were performed at 9 permanent exterior soil gas probes in this area. Concentrations of one or more site-specific VOCs were detected above EPA VISLs at three of the nine soil gas probes. Based on the 2016 investigation results, four residential properties were identified for interior vapor intrusion sampling, but only two granted access. Two rounds of interior vapor intrusion sampling (subslab soil gas, and/or indoor, outdoor air) were performed at these two properties, one in February and one in June 2017.

Vapor intrusion investigations were conducted in 2016 at the other two areas identified for additional investigation based on the 2014 and 2015 investigation results. Two rounds of interior vapor intrusion sampling (subslab soil gas, and/or indoor, outdoor, and/or crawlspace air) were performed at one property in each of the two areas (one commercial [Property 5][1] and one residential [Property 6][2]), one in August and one in December 2016.

[1] Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[2] Property 6 was previously identified as the residential property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

Additionally, per EPA request, in June 2017, a third round of interior vapor intrusion sampling was performed at the residential property (Property 6[2]) previously sampled in 2016. This property was located directly across from one of the contaminant sources at the site (Source Area 4). Following the August 2016 soil gas investigation, remedial actions began by Illinois EPA (IEPA) at the source area to clean the soil and pull impacted soil gas back towards the source area. The June 2017 samples were collected following completion of this remedial action to evaluate its effectiveness. Electrical Resistance Heating process was applied to the source area soils in Area 4 from November 2016 through February 2017. The remedial activities at Source Area 4 are anticipated to be documented in a Remedial Action Completion Report that will be submitted to EPA by IEPA (Kirchner 2017).

The following field documentation items are attached to this memorandum:

- Attachment 1—Photographic Log
- Attachment 2—Soil Boring Logs
- Attachment 3—Soil Gas Probe Construction Logs
- Attachment 4—Soil Gas Sampling Forms
- Attachment 5—Building Survey Forms
- Attachment 6— Subslab Soil Gas, and Indoor, Crawlspace, and Outdoor Air Sample Forms
- Attachment 7—Waste Characterization Results and Disposal Documentation
- Attachment 8—Data Quality Evaluation Memorandums

Site Description and History

The site is located in the City of Rockford, Winnebago County, Illinois, and consists of an approximately 7.5-square-mile area (Figure 1). The overall site is defined in the June 2002 Record of Decision as the area where groundwater contamination exceeds 10 parts per billion of total chlorinated VOCs (EPA 2002). Benzene, ethylbenzene, toluene, and xylenes are also identified in the Record of Decision as groundwater contaminants of concern. Much of the groundwater plume underlies an area of mixed residential and commercial properties extending from Sandy Hollow Road to North 23rd Avenue and from Alpine Road west to the Rock River (Figure 1). There are four primary source areas within the site: Area 4, Area 7, Area 9/10, and Area 11. A description of each source area and a summary of investigations/remediation activities previously conducted in each source area are presented in the *Uniform Federal Policy Quality Assurance Project Plan* (UFP-QAPP) (CH2M 2014).

Previous Vapor Intrusion Investigations

Historical Soil Gas Surveys

Soil gas surveys were conducted by Camp, Dresser & McKee (CDM) during Phase I and Phase II site investigations between 1991 and 1993, and additional soil gas sampling was conducted in 1996 within Areas 4, 7, 9/10, and 11. Residential indoor air sampling was conducted during the remedial investigation in Areas 4 and 7, and additional indoor air sampling was conducted in 2002 in Areas 4 and 7. The historical soil gas data may no longer be representative of the current site conditions because soil gas conditions have likely changed over the past 20 years due to contaminant migration and remedial actions at the source areas. However, 1,1,1-trichloroethane [1,1,1-TCA], trichloroethene (TCE), and tetrachloroethene (PCE) were frequently detected in soil gas samples collected in Areas 4, 7, and 9/10, and mitigation of vapor intrusion was not recommended at any of the buildings sampled based on the indoor air results. The following reports contain the historical vapor intrusion investigation results:

- *Southeast Rockford Final Remedial Investigation* Report (CDM 1995)
- *Final Remedial Investigation Report for the Southeast Rockford Source Control Operable Unit* (CDM 2000)
- *Technical Memorandum: Southeast Rockford Indoor Air Sampling Study* (CDM 2004)

2014 and 2015 Soil Gas Investigations

In 2014, a deep soil gas investigation was conducted by CH2M throughout the site. As part of the investigation, 48 permanent deep soil gas probes were installed within the groundwater plume extent as defined in *Statistical Analysis of Chemicals Concentrations in Groundwater and Mapping* (S.S. Papadopulos 2012). Two rounds of sampling were attempted at each soil gas probe. Eight of these probes were unable to be sampled because a vacuum in the probe was observed during purging. Detected concentrations of one or more site-specific VOCs exceeded EPA VISLs (i.e., the most recent version available at the time of sampling) at six of the 40 soil gas probes sampled in 2014. Based on the 2014 deep soil gas investigation findings, it was concluded that additional investigation of the potential for vapor intrusion at the site was necessary (CH2M 2015, 2016a).

In 2015, 22 additional permanent soil gas probes were installed at the site to refine the delineation of the soil gas plume and assess the vertical profile of site-related VOCs in the vadose zone. Two rounds of sampling were attempted at each newly installed soil gas probe, and 34 of the probes installed in 2014 that had detectable concentrations of site-specific VOCs below the EPA VISLs. A total of 61 soil gas probes, 10 of which were co-located dual-depth probes, was sampled at least once between 2014 and 2015.

Following 2014 and 2015 sampling, detected concentrations of one or more site-specific VOCs exceeded EPA VISLs at 7 of the 61 sampled soil gas probes. Several of these exceedances were observed in deep soil gas probes, where a co-located shallow probe at the same location had VOC concentrations less than VISLs. This suggested that deep soil gas contamination was not migrating upwards through the soil column at concentrations of concern for the vapor intrusion pathway at these locations. It was concluded that additional investigation of the potential for vapor intrusion at the site was necessary near three soil gas probes (SG-25, SG-51, and SG-66) where detected VOC concentrations exceeded VISLs (CH2M 2015, 2016a).

Field Activities

Field investigation activities were conducted in accordance with the UFP-QAPP (CH2M 2014), the UFP-QAPP Addendum I (CH2M 2015), the UFP-QAPP Addendum II (CH2M 2016b), and the UFP-QAPP Addendum III letter (CH2M 2017). Deviations from the UFP-QAPP and UFP-QAPP addendums are presented in Table 1. Field investigation activities were conducted on the dates shown in Table 2. A detailed discussion of the soil gas and interior vapor intrusion investigation activities is included in the following subsections. Photographs of the investigation activities are included in Attachment 1.

Field investigation activities were conducted on private properties within the City of Rockford. Prior to starting work, access agreements were sent to the owners of properties identified for sampling. Representatives of EPA visited the site on multiple occasions to attempt to meet with property owners who did not respond to the access agreement requests.

Deep Soil Vapor Investigation Activities—2016

Utility Locating

Underground utilities were identified and marked near each proposed exterior soil gas probe and soil boring location by the Indiana one-call service and by Blood Hound Inc., a private utility-locating subcontractor. The utility-locating subcontractor used ground-penetrating radar, electromagnetics, and a magnetometer to verify and mark the presence of subsurface utilities or other potential subsurface objects that could be damaged by intrusive work. Intrusive activities were not performed within 10 feet of an overhead power line or within 5 feet of a marked underground utility.

Soil Borings

Soil borings were collected at 7 of the soil gas probe locations installed in August 2016 (Figure 2). Soil borings were collected at these locations to obtain additional lithology and depth-to-groundwater data. Soil borings were collected from the properties proposed in the UFP-QAPP Addendum II (CH2M 2016b).

However, the final locations were adjusted as needed to avoid obstructions and accommodate property owner requests.

Terra Probe Environmental advanced the soil borings using hand augers or direct-push technology (DPT) using 4- or 5-foot-long Geoprobe Macro-Core Samplers with disposable liners. The method used to obtain the soil boring at each location was selected in the field by considering the ability for a drill rig to access the location (which was limited by narrow side-yards, landscaping, or steep topography). Soil borings were advanced with the drill rig or hand auger until saturated conditions were encountered or until refusal was reached. Soil borings were characterized by CH2M using the Unified Soil Classification System in accordance with ASTM International Standard Practice for Description and Identification of Soils (ASTM International D2488). Soil cores obtained from the DPT rig were also photographed. Soil boring logs are included in Attachment 2.

Exterior Soil Gas Probe Installation

Nine permanent soil gas probes were installed by Terra Probe Environmental in August 2016 using a DPT rig or hand augers (Figure 2). The probes were installed on the properties proposed in the UFP-QAPP Addendum II (CH2M 2016b); however, the final locations were adjusted as needed to avoid obstructions and accommodate property owner requests.

The exterior soil gas probes were installed after completion of the boring, once the desired bottom screen depth was achieved. If required, filter sand was used to fill the boring to the desired bottom screen depth before the probe screen and tubing were lowered to the bottom. Each exterior soil gas probe consists of a 6-inch-long, 0.5-inch-outer-diameter (OD) stainless-steel wire mesh screen attached to 0.25-inch-OD Teflon tubing that extends to the ground surface. Filter sand was placed around and at least 4 inches above the screen to prevent bentonite from clogging the screen. At least 1 foot of powdered bentonite was then placed above the filter sand. The remainder of each borehole was filled with granular bentonite and hydrated in lifts to the ground surface. Each probe was completed with a 6-inch-diameter, locking, traffic-rated flush-mount cover secured with cement. Installation information for each probe is summarized in Table 3, and construction logs for the probes installed in August 2016 are included in Attachment 3. Deviations from the methods of construction specified in the UFP-QAPP Addendum II are summarized in Table 1.

The final location of each soil gas probe was documented with a handheld Trimble global positioning system (GPS) unit. GPS coordinates for each soil gas probe location are included in Table 3.

Exterior Soil Gas Probe Sampling

Prior to sampling, a helium-leak check was performed, and three dead volumes of soil gas were purged from each probe. One dead volume includes the volume of soil gas within the sand filter pack and sand backfill , plus the volume of soil gas within the probe tubing. Each volume of soil gas purged is screened with a helium detector and a photoionization detector. Except for one probe (SG-80) in August 2016, the soil gas probes passed the helium-leak checks prior to sampling. The probe that did not pass the helium-leak check in August 2016 had suspected methane interference based on photoionization detector and helium detector readings. The presence of methane gas in the subsurface has the potential to result in false readings on a helium detector. The sampling approach for this location was modified as described in Table 1, so that a sample could be collected.

Soil gas samples were collected from 7 of the 9 exterior soil gas probes during two separate sampling events in August and November/December 2016. Two of the soil gas probes (SG-74 and SG-79) could not be sampled because a vacuum in the probe was observed during purging, indicating that there was an insufficient volume of soil gas present. This occurs due to either fine-grained soils or groundwater within the probe. Soil present in the area is mostly very dense clay, which may be why sampling of these probes was infeasible.

Deep soil gas samples were collected from each soil gas probe in 1-liter evacuated canisters equipped with flow controllers set to 200 milliliters per minute. The exterior soil gas samples were analyzed for site-specific VOCs (1,1,1-TCA, 1,1,2-trichloroethane, 1,1-dichloroethane [1,1-DCA], 1,1-dichloroethene [1,1-DCE], 1,2-dichloroethane, cis-1,2-dichloroethene, benzene, ethylbenzene, methylene chloride, PCE, toluene, trans-1,2-dichloroethene, TCE, vinyl chloride, and xylenes) by EPA method TO-15.

The initial and final canister vacuums were measured in the field with a digital gauge. Exterior soil gas probe sampling forms are included in Attachment 4.

Interior Vapor Intrusion Sampling—2016 and 2017

Interior vapor intrusion sampling was performed at a total of four properties (Figure 3) in 2016 and 2017 as follows:

- Property 5 (commercial)[3]—Interior vapor intrusion sampling was performed in August and December 2016. Three subslab soil gas probes, two indoor air, and one outdoor air locations were sampled.
- Property 6 (residential)[4]—Interior vapor intrusion sampling was performed in August and December 2016, and again in June 2017 after nearby remedial activities were completed. Two subslab soil gas probes, one crawlspace air, two indoor air, and one outdoor air locations were sampled.
- Property 3 (residential)—Interior vapor intrusion sampling was performed in February and June 2017. Three subslab soil gas probes, two indoor air, and one outdoor air locations were sampled.
- Property 4 (residential)—Interior vapor intrusion sampling was performed in February and June 2017. Three subslab soil gas probes, two indoor air, and one outdoor air locations were sampled.

Utility Locating

Underground utilities were identified and marked by a private utility locator (Blood Hound, Inc.) before drilling and installation of the subslab soil gas probes. The concrete slab was scanned using ground-penetrating radar, and utilities were marked, if present. Rebar and other anomalies within and under the slab were also marked. The Illinois one-call service was also notified of drilling activities, for marking of public utilities leading into buildings.

Building Surveys

In order to identify and document building characteristics pertinent to vapor intrusion, building surveys were performed using the building survey form from the UFP-QAPP Addendum II. These surveys were reviewed prior to each sampling event, and updated as necessary. Building information, including building use, building history and occupancy, approximate building dimensions, concrete floor slab condition and type, general operation of the heating, ventilation, air-conditioning system, and atypical preferential pathways, were obtained by visual inspection and from discussions with the occupants.

Chemical products stored and activities performed within the building that could be potential sources of VOCs in indoor air (for example, paint, gasoline cans, solvents, cleaning products) were also identified. A photoionization detector with the capability of reading in units of parts per billion (ppbRAE) was used to screen for VOCs within the buildings, focusing on areas where chemical products that may contain or produce VOCs are stored, to determine if those products are confounding indoor VOC sources. With the

[3] Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[4] Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

building occupants' permission, the identified potential confounding indoor VOC sources were documented and placed in plastic totes outside of the building prior to, and for the duration of, the air-sampling event.

Building survey forms are provided in Attachment 5.

Subslab Soil Gas Probe Installation

The locations of the subslab soil gas probes were selected during the building survey based upon the building survey results, the guidance outlined in the UFP-QAPP Addendum II, and property owner preference. Subslab soil gas probes were installed in 11 locations at 4 properties. Up to three subslab soil gas probes were installed in each building. To install each subslab soil gas probe, a hole was drilled through the concrete slab of a building using a rotary hammer drill and a Cox-Colvin & Associates, Inc. Vapor Pin was inserted into the hole. A flushmount stainless-steel cover was installed to cover each probe. Locations of the subslab soil gas probes installed in each building are documented on the building survey forms (Attachment 5).

Subslab Soil Gas, and Indoor, Crawlspace, and Outdoor Air Sampling

Prior to sampling during each event, each property was re-screened with a ppbRAE to verify that there were no new products that may be confounding indoor air VOC sources. Subslab soil gas, indoor air, crawlspace air (when present), and outdoor air samples were collected at each property concurrently over a 24-hour period for residential properties and an 8-hour period for commercial properties. Sampling activities took place at least 72 hours after completing subslab soil gas probe installation activities to allow indoor air conditions to equilibrate. Subslab soil gas, indoor air, and crawlspace air sampling forms are included in Attachment 6.

A water dam leak check was performed on each subslab soil gas probe to verify they were installed correctly. A vacuum pump was used to purge 1 liter of soil gas at a rate of 200 milliliters per minute at each subslab probe, and the concentration of total VOCs in purged soil gas was measured with a photoionization detector. Each subslab soil gas probe passed the leak check prior to sampling (see Attachment 6)

In accordance with the QAPP Addendum II, two indoor air samples were collected from each property during each sampling round, except where noted in Table 1. At each property, one indoor air sample was collected from the basement, and the other was collected from the first floor. Indoor air sample locations were selected based on the building survey results, the guidance outlined in the QAPP Addendum II, and property owner preference.

When crawlspaces were identified in a building, crawlspace air samples were collected instead of subslab soil gas samples in that portion of the building (none of the properties sampled had a complete crawlspace). Three subslab soil gas and/or crawlspace air samples were collected from each property each event. Crawlspaces were sampled as found (i.e., if open, were sampled open; if closed, were sampled closed). Canisters were connected to Teflon tubing that was inserted through a loose-fitting polyvinyl chloride guide pipe into the crawlspace so the tubing inlet could be placed at least several inches off the ground and directed to the center of the crawlspace.

One outdoor air sample was collected at each property concurrently with the subslab soil gas, crawlspace air, and indoor air sampling. Outdoor air samples were placed in an upwind location (based upon prevailing winds over the 24-hour sample period) of the buildings being sampled and were secured to an immoveable structure (such as fence, fence post, stop sign, etc.) with a bike lock for security.

Subslab soil gas, indoor air, crawlspace air, and outdoor air samples were collected in 6-liter evacuated canisters. The canisters at residential properties were collected over a period of approximately 24 hours, and the canisters at the commercial property were collected over a period of approximately 8 hours. The initial and final canister vacuums were measured in the field with a digital gauge. Sampling forms are included in Attachment 6. The subslab soil gas samples were analyzed for site-specific VOCs (1,1,1-TCA,

1,1,2-trichloroethane, 1,1-DCA, 1,1-DCE, 1,2-dichloroethane, cis-1,2-dichloroethene, benzene, ethylbenzene, methylene chloride, PCE, toluene, trans-1,2-dichloroethene, TCE, vinyl chloride, and xylenes) by EPA Method TO-15, and the indoor air, crawlspace air, and outdoor air samples were analyzed for the same site-specific VOCs by EPA method TO-15 SIM.

In accordance with the QAPP Addendum II, because industrial facilities typically have confounding indoor air sources, the indoor air samples collected from the commercial property were held for analysis pending the results of the subslab soil gas samples. Per direction from EPA, because the detected concentrations in the subslab soil gas samples were below commercial VISLs, the indoor air and outdoor air samples collected at the commercial property in December 2016 were not analyzed.

Quality Assurance/Quality Control Samples

Quality assurance (QA)/quality control (QC) field duplicate samples were collected at a frequency of at least 10 percent during the 2016 and 2017 sampling events, in accordance with the UFP-QAPP and UFP-QAPP Addendums. Duplicate air and soil gas samples were collected using T-connectors so that the parent and duplicate samples were collected simultaneously.

Field Equipment Decontamination

Disposable materials (core liners) were used for the collection of soil cores. Non-disposable equipment (drilling rods and hand auger) used during the soil gas investigation was decontaminated by washing with Alconox, followed by a water rinse prior to reuse. Cleaned and certified canisters and flow controllers were provided by the laboratory.

Investigation-derived Waste

Investigation-derived waste (IDW) generated during collection of the soil cores and installation of the exterior deep soil gas probes installed in August of 2016 included three waste streams: soil, decontamination water, and personal protective equipment/disposable sampling equipment (core liners). Each waste stream was separately containerized in 55-gallon drums and placed in a secured staging area located within the site. No IDW was generated during the work conducted in 2017.

IDW was characterized and disposed of as nonhazardous waste in accordance with the UFP-QAPP Addendum II. Soil IDW samples were analyzed for the following: toxicity characteristic leaching procedure (TCLP) VOCs, TCLP semivolatile organic compounds (SVOCs), TCLP metals (including mercury), TCLP pesticides, TCLP herbicides, total polychlorinated biphenyls, pH, flashpoint, and percent moisture. Aqueous samples were collected and analyzed for the following: VOCs, SVOCs, pesticides, herbicides, Resource Conservation and Recovery Act metals, and corrosivity. Waste characterization results and documentation of IDW disposal are included in Attachment 7.

Data Validation

In accordance with the UFP-QAPP and QAPP Addendums, a Level III validation was performed on 100 percent of the data, and a Level IV validation was performed on 10 percent of the data. Validated analytical results are presented in Tables 5 to 9. The data quality evaluation memorandums are included in Attachment 8.

Screening Levels

The screening levels used to evaluate the exterior soil gas, subslab soil gas, indoor air, and crawlspace air sampling results were obtained from the EPA VISL Calculator Version 3.5.1 (EPA 2016) using the June 2017 Regional Screening levels (EPA 2017). The soil gas and air VISLs are based on a target risk of 1×10^{-5} and a target hazard quotient (HQ) of 1, and. The soil gas and air Risk Management Levels (RMLs) are based on a target risk of 1×10^{-4} and a target HQ of 3, except for TCE, which is based on a target HQ of 1.

Screening levels were calculated for both residential and commercial exposure scenarios. The residential soil gas screening levels were used to evaluate the exterior soil gas sampling results. The commercial screening levels were used to evaluate the interior vapor intrusion sampling results from the one commercial property and the residential screening levels were used to evaluate the three residential properties. EPA VISLs were used to evaluate long-term risks, and EPA RML equivalents were used to evaluate short-term risks.

Investigation Results

Site Geology and Hydrogeology

In general, soils encountered during drilling activities at the site consisted of silt, clay, and sandy clay mixtures. Occasional sand and gravel seams, when present, generally occur around 10 feet below ground surface and are several feet thick.

Groundwater was encountered in six of the soil borings at the site at a depth ranging from 7.5 to 22 feet below ground surface during drilling activities. The depth to groundwater increases towards the west along Balsam Lane and Bannister Drive, and is shallow (about 7.5 feet) to the north of Balsam Lane and Bannister Drive.

Deep Exterior Soil Gas Probes Sample Results

VOC Results

Exterior soil gas sampling results from 2016 were evaluated according to the specific objectives outlined in the UFP-QAPP Addendum II. Deep soil gas analytical results were screened against EPA soil gas VISLs (Table 4). Three of the 7 exterior soil gas probes sampled in August 2016 had detected concentrations of one or more site-specific VOCs that exceeded the EPA soil gas VISLs. The following VOCs were detected at concentrations exceeding the EPA soil gas VISLs: benzene, ethylbenzene, and xylenes (Table 5). Soil gas probes with VOC detections exceeding VISLs in 2016 are shown in Figure 4. Detected concentrations of site-specific VOCs were less than the EPA soil gas VISLs in December 2016. Detected concentrations of site-specific VOCs were less than the EPA soil gas RMLs in August and December 2016.

Helium Results

The soil gas probe SG-80 did not pass the helium-leak check in August 2016, likely due to methane interference. The presence of methane gas in the subsurface has the potential to result in false readings on a helium detector. Based upon lower explosive limit concentrations measured in soil gas at this probe, methane interference was suspected. For this reason, the sample from probe SG-80 was also analyzed for helium to evaluate the integrity of the soil gas probe. A concentration of at least 20 percent helium was maintained in a shroud over the probe during sampling. Helium was detected at a concentration of 90 parts per million volume in the laboratory sample. The concentration detected in the sample was less than 1 percent of that maintained in the shroud; therefore, the probe passed the leak check during August 2016 sampling. Helium analytical results are presented in Table 8.

Interior Vapor Intrusion Sample Results

The interior vapor intrusion sampling results from the four properties sampled in 2016 and 2017 were evaluated according to the specific objectives outlined in the UFP-QAPP Addendum II and UFP-QAPP Addendum III. The sampling results compared to screening levels are provided in Tables 5 to 7. The vapor intrusion evaluation results for each property are presented in the following subsections.

Property 5 (Commercial)

Three subslab soil gas, two indoor air, and one outdoor air samples were collected at Property 5 in August and November 2016 (Tables 5 to 7).

- Subslab soil gas—TCE was measured in one of the three subslab soil gas samples at a concentration above the EPA commercial soil gas RML in August 2016. However, detected concentrations of site-specific VOCs were less than the EPA commercial soil gas VISLs and RMLs in the three subslab soil gas samples in November 2016.
- Indoor Air—Detected concentrations of site-specific VOCs were less than the EPA commercial indoor air VISLs (and RMLs) in August 2016. The November 2016 indoor air samples were not analyzed because detected concentrations of site-specific VOCs in the subslab soil gas samples were less than the EPA commercial VISLs.

The vapor intrusion pathway is not currently complete or significant at Property 5 because indoor air concentrations of site-specific VOCs were below the EPA commercial indoor air VISLs. However, there is a potential for this to occur in the future because TCE was measured in subslab soil gas at a concentration above the EPA commercial soil gas RML.

Property 6 (Residential)
Two subslab soil gas, one crawlspace air, two indoor air, and one outdoor air samples were collected at Property 6 in August and November 2016, and again in June 2017 after nearby Source Area 4 remedial actions were completed by IEPA (Tables 5 to 7).

- Subslab soil gas—TCE was measured in one of the two subslab soil gas samples at a concentration above the EPA residential soil gas RML in August 2016. However, detected concentrations of site-specific VOCs were less than the EPA residential soil gas VISLs and RMLs in the two subslab soil gas samples in November 2016 and June 2017.
- Crawlspace air—
  - TCE was detected in the crawlspace air sample at a concentration above the EPA residential indoor air RML in August 2016.
  - 1,2-Dichloroethane (1,2-DCA) was detected at concentrations above the EPA residential indoor air VISL in August 2016; however, 1,2-DCA was not detected in subslab soil gas in August 2016 or June 2017, and in November 2016 the detected concentrations of 1,2-DCA in subslab soil gas were an order of magnitude less than detected concentrations in the crawlspace. Additionally, detected concentrations of 1,2-DCA in the August 2016 indoor air sample (collected on the first floor) were greater than detected concentrations in the crawlspace. Therefore, the presence of 1,2-DCA in crawlspace air is likely related to an indoor VOC source and not vapor intrusion.
- Indoor air—1,2-DCA was detected in the August 2016 first-floor air sample and June 2017 basement indoor air samples at concentrations above the EPA residential indoor air VISL. As discussed above, its presence in indoor air and crawlspace air is likely related to an indoor source and not vapor intrusion.

The vapor intrusion pathway is not currently complete or significant at Property 6 because either the detected concentrations of site-specific VOCs in indoor air were below the EPA residential indoor air VISLs, or they were likely related to an unidentified confounding indoor air source. Although TCE was measured in the August 2016 subslab soil gas and crawlspace air samples at concentrations above the EPA residential RMLs, TCE concentrations at these sample locations were below the EPA residential VISLs/RMLs in the June 2017 samples (that is, after remedial actions were completed).

Comparison of cooling season subslab soil gas data collected before and after the Source Area 4 remedial actions (August 2016 and June 2017) indicate that the remedial actions reduced concentrations of site-related VOCs in subslab soil gas. Detected concentrations of site-specific VOCs were less than the EPA residential soil gas VISLs in the June 2017 subslab soil gas samples, indicating that the vapor intrusion pathway is expected to be incomplete in the future if site conditions remain the same.

Property 3 (Residential)
Three subslab soil gas, two indoor air, and one outdoor air samples were collected at Property 3 in February and June 2017 (Tables 5 to 7).

- Subslab soil gas—Detected concentrations of site-specific VOCs were less than the EPA residential soil gas VISLs and RMLs in February and June 2017.
- Indoor air—1,2-DCA and benzene were detected at concentrations above the EPA residential indoor air VISLs in February and June 2017 in the basement and first-floor indoor air samples. However, it is likely that these detections are related to a confounding indoor source (as opposed to vapor intrusion) because detected concentrations of 1,2-DCA and benzene in subslab soil gas were an order of magnitude less than concentrations in indoor air. Additionally, detected concentrations of 1,2-DCA and benzene in the samples collected from the first floor were greater than the samples collected in the basement.

The vapor intrusion pathway is not currently complete or significant at Property 3 because the detected concentrations of site-specific VOCs in indoor air were either below the EPA residential indoor air VISLs or they were likely related to an unidentified confounding indoor air source. The vapor intrusion pathway is expected to be incomplete in the future if site conditions remain the same because subslab soil gas concentrations of site-specific VOCs were below the EPA residential soil gas VISLs.

Property 4 (Residential)
Three subslab soil gas, two indoor air, and one outdoor air samples were collected at Property 4 in February and June 2017 (Tables 5 to 7).

- Subslab soil gas—Detected concentrations of site-specific VOCs were less than the EPA residential soil gas VISLs and RMLs in February and June 2017.
- Indoor air —1,2-DCA was detected at concentrations above the EPA residential indoor air VISL in February and June 2017 in the basement and first-floor indoor air samples. However, it is likely that these detections are related to a confounding indoor source (as opposed to vapor intrusion) because detected concentrations of 1,2-DCA in subslab soil gas were an order of magnitude less than concentrations in indoor air. Additionally, detected concentrations of 1,2-DCA in the samples collected from the first floor were greater than the samples collected in the basement.

The vapor intrusion pathway is not currently complete or significant at Property 4 because the detected concentrations of site-specific VOCs in indoor air were either below the EPA residential indoor air VISLs or they were likely related to an unidentified confounding indoor air source. The vapor intrusion pathway is expected to be incomplete in the future if site conditions remain the same because subslab soil gas concentrations of site-specific VOCs were below the EPA residential soil gas VISLs.

Conclusions

Exterior soil gas sampling performed at the site from 2014 to 2016 indicated that there was a potential for vapor intrusion impacts to six properties. Access for vapor intrusion investigation was granted for four of the six properties: one commercial and three residential. Interior vapor intrusion sampling was performed at these four properties in 2016 and 2017. The interior sampling results indicate that the vapor intrusion pathway is not currently complete or significant at these four properties. The vapor intrusion pathway is expected to be incomplete in the future at the three residential properties if site conditions remain the same. There is a potential for the vapor intrusion pathway to become complete and significant at the one commercial property because subslab soil gas concentrations of TCE exceeded the EPA commercial soil gas RML.

Technical Exceptions for Vapor Intrusion Investigations

The technical memorandum provides results regarding the potential occurrence and significance of vapor intrusion based on reasonably obtainable sampling data and observations.

The vapor intrusion investigation does not address other indoor air quality problems, including mold or mildew, radon, building air quality unrelated to subsurface site-specific VOCs, or general indoor ventilation issues.

The vapor intrusion investigation and technical memorandum do not address landfill gas or explosive atmospheres.

The technical memorandum provides comparisons of subslab soil vapor, crawlspace air, and indoor air data with EPA VISLs and RMLs. The comparisons are not intended to imply the presence or absence of healthful or safe indoor air quality, and do not represent any medical opinion.

The results and conclusions presented in the technical memorandum are developed for land uses and site conditions as characterized by the available data. Any changes in land use or site conditions based on additional information may warrant reevaluation of the results and conclusions of the vapor intrusion investigation.

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Tables

Table 1. Summary of Deviations from the UFP-QAPP and UFP-QAPP Addendums

Southeast Rockford Groundwater Contamination Superfund Site, Rockford, IL

Type of Deviation	Deviation from the UFP-QAPP or UFP-QAPP Addendums
Exterior Soil Gas Investigation	
Moved Soil Gas Probe and Soil Boring Locations	The soil gas probes were installed on the properties proposed in the UFP-QAPP Addendum II, however the final locations were adjusted as needed to avoid obstructions and accommodate property owner requests.
Soil Gas Probe Installation Method	Soil gas probes were installed with a hand auger at several locations instead of a drill rig for the following reasons: ● The drill rig was not able to access the installation location (SG-78 and SG-82). ● the drill rig equipment malfunctions (SG-80 and SG-81).
Exterior Soil Gas Probe Construction	Due to the shallow installation depth of soil gas probe SG-75, the construction was modified to have approximately 4 inches of sand above the top of the screen instead of 6 inches, and one foot of dry bentonite seal instead of three feet. Due to the shallow installation depth of soil gas probe SG-81, the amount of dry bentonite seal was modified to two feet instead of three feet. Two of the exterior soil gas probes (SG-79 and SG-80) were inadvertently installed with over 12 inches of sand above the top of the screen instead of 6 inches. When the probe depth allowed (SG-74, SG-76, SG-77, SG-78, SG-79, SG-80, SG-81, and SG-82), the quantity of dry bentonite was increased from 3 feet, to ensure a good seal at the probe.
Type/Quantity of Exterior Soil Gas Samples Collected	Two of the exterior soil gas probes were unable to be sampled due to a vacuum observed in each of the probes during purging (a vacuum is usually observed if a probe is installed in dense soil or if it is installed in the water table). ● One of the probes (SG-79) was installed in dense soil (mostly silts) at a depth greater than 5 feet above the water table. ● A soil boring was not completed at the other probe location (SG-74) per request of EPA and this change was documented in the revision to the Work Plan for the site. Therefore, the probe was blind installed based upon the water elevations historically observed at monitoring well MW-133A and the groundwater elevations at the other soil borings completed in the area. It is unknown what subsurface condition has contributed to not being able to collect a sample. During sampling activities, it was noted that a minimal amount of soil vapor was present at one of the exterior soil gas probes (SG-80). After discussions with EPA, the sampling approach was modified from the QAPP Addendum II due to limited soil vapor at this location. The modified sample approach was as follows: soil vapor was purged from the probe before a vacuum was observed, then purging was stopped, and the probe was allowed to recover before it was purged more. This process was continued until one volume of soil gas was removed from the probe, and then the probe was sampled. Additionally, due to suspected methane interference at this probe, the sample was collected with helium on in sampling shroud. The sample from this location was submitted for helium analysis addition to volatile organic compounds (VOCs) in August 2016 to confirm the probe was leak free.
Rate of Sample Collection	During the August and December 2016 sampling events, some of the flow controllers for exterior soil gas sample locations were set at a slightly higher or slightly lower flow rate lower than specified in the UFP-QAPP Addendum II. This resulted in the sample being collected slightly faster or slower than specified in the UFP-QAPP Addendum II (4-10 minute sample time). As discussed above the sample collection method was modified for SG-80 which resulted in the samples being collected over a longer period of time than specified in the UFP-QAPP Addendum II.
Final Sample Canister Pressures	The UFP-QAPP Addendum I specifies a desired canister final ending pressure between -2 to -5 inches of mercury for a 1-liter canisters. There were several occurrences where the final canister pressure was outside of this ideal range. In some cases, the ending canister pressure was greater than -2, and in some cases, less than -5. The final ending pressure did not affect data quality or elevate the laboratory detection limits above screening criteria.
Vapor Intrusion Investigation	
Quantity of Properties Sampled	The property owner for Property 2 was not responsive to requests to schedule sampling; therefore, this property was not sampled in 2017. Access was not granted to Property 1 which resulted in the overall total number of properties sampled being reduced.
Rate of Sample Collection	During sampling activities in August 2016, one flow controller had a flow rate set higher than specified in the UFP-QAPP Addendum II. This resulted in the sample being collected more rapidly, and the ending pressure of the canister was zero when samples were picked up. Per conversations with the CH2M senior technical resource and EPA on August 17, 2016, it was determined that sufficient samples had been collected at this property to assess the vapor intrusion (VI) pathway and did not require a resampling of this indoor air sample.
Final Sample Canister Pressures	The UFP-QAPP Addendum II specifies a desired canister final ending pressure between -10 to -2 inches of mercury for a 6-liter canister. There were several occurrences where the final canister pressure was outside of this ideal range. In some cases, the ending canister pressure was greater than -2, and in some cases, less than -10. The final ending pressure did not affect data quality or elevate the laboratory detection limits above screening criteria.

EPA = U.S. Environmental Protection Agency

UFP-QAPP = Uniform Federal Policy Quality Assurance Project Plan

Table 2. Investigation Activities Dates

Southeast Rockford Groundwater Contamination Superfund Site, Rockford, IL

Date	Field Activities
August 8 through 19, 2016	● Utility locating ● Collection of soil borings ● Installation of exterior soil gas probes ● Collection of exterior soil gas probe samples ● Collection of investigation derived waste samples ● Building surveys at two properties ● Installation of subslab gas probes at 2 properties ●Collection of subslab soil gas samples, indoor air samples, and crawlspace air samples (where present) at 2 properties ●Collection of outdoor air samples
November 28 through December 1, 2016	● Collection of exterior soil gas probe samples ● Collection of subslab soil gas samples, indoor air samples, and crawlspace air samples (where present) at 2 properties ● Collection of outdoor air samples
February 15 through 23, 2017	● Utility locating ● Building surveys ● Installation of subslab gas probes at 2 properties ● Collection of subslab soil gas samples and indoor air samples at 2 properties ● Collection of outdoor air samples
June 7 through 10, 2017	● Collection of subslab soil gas samples, indoor air samples, and crawlspace air samples (when present) at 3 properties ● Collection of outdoor air samples

Table 3. Exterior Soil Gas Probe Installation Summary - August 2016

Southeast Rockford Groundwater Contamination Superfund Site, Rockford, IL

Probe Location	Northing [a]	Easting [a]	Screen Length (inches)	Bottom of Screened Interval (ft bgs)
SG-74	non-responsive		6	11.8
SG-75			6	5.8
SG-76			6	15.0
SG-77			6	16.4
SG-78			6	11.4
SG-79			6	13.4
SG-80			6	11.3
SG-81			6	8.0
SG-82			6	13.4

ft bgs = feet below ground surface

[a] NAD83 Illinois State Plane West, US Feet.

[b] All soil gas probes were installed in Rockford, IL.

Table 4. Exterior Soil Gas Probe Sampling Results - 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

				SER-SG-75		SER-SG-76			SER-SG-77		
		Residential	Residential Soil Gas RML	SER-SG-75-0816	SER-SG-75-1216	SER-SG-76-0816	SER-SG-76-0816-FD	SER-SG-76-1216	SER-SG-77-0816	SER-SG-77-1216	SER-SG-77-1216-FD
Compound	**Units**	**Soil Gas VISL[a]**	**Equivalent[b]**	**8/18/2016**	**12/1/2016**	**8/18/2016**	**8/18/2016**	**12/1/2016**	**8/16/2016**	**12/1/2016**	**12/1/2016**
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	7.6 U	2 U	**64**	**65**	**59**	**180**	**150**	**150**
1,1,2-Trichloroethane	ug/m^3	7	21	7.6 U	2 U	2.5 U	2.6 U	1.8 U	1.9 U	2.2 U	2.2 U
1,1-Dichloroethane	ug/m^3	580	5,800	7.6 U	2 U	2.5 U	2.6 U	1.8 U	1.9 U	2.2 U	2.2 U
1,1-Dichloroethene	ug/m^3	7,000	21,000	7.6 U	2 U	2.5 U	2.6 U	**2.5**	1.9 U	**4.7**	**5.3**
1,2-Dichloroethane	ug/m^3	36	360	7.6 U	2 U	2.5 U	**1.3 J**	1.8 U	1.9 U	2.2 U	2.2 U
Benzene	ug/m^3	120	1,200	**52**	2 U	**36**	**37**	**0.58 J**	**4.4**	2.2 U	2.2 U
cis-1,2-Dichloroethene	ug/m^3	--	--	7.6 U	2 U	**1.1 J**	2.6 U	1.8 U	1.9 U	2.2 U	2.2 U
Ethylbenzene	ug/m^3	370	3,700	**660**	2 U	**130**	**130**	1.8 U	**13**	2.2 U	2.2 U
Methylene Chloride	ug/m^3	21,000	63,000	7.6 U	2 U	**2 J**	**2.8**	1.8 U	**8.6**	2.2 U	2.2 U
Tetrachloroethene	ug/m^3	1,400	4,200	**13**	2 U	**11**	**2.4 J**	**1.4 J**	**13**	**14**	**15**
Toluene	ug/m^3	170,000	520,000	**1,300 J**	2 U	**370 J**	**380 J**	**0.77 J**	**30 J**	2.2 U	2.2 U
trans-1,2-Dichloroethene	ug/m^3	--	--	7.6 U	2 U	2.5 U	2.6 U	1.8 U	1.9 U	2.2 U	2.2 U
Trichloroethylene	ug/m^3	70	70	7.6 U	2 U	**0.98 J**	2.6 U	1.8 U	**2.9**	**2.8**	**2.7**
Vinyl Chloride	ug/m^3	56	560	7.6 U	2 U	2.5 U	2.6 U	1.8 U	1.9 U	2.2 U	2.2 U
Xylene, o	ug/m^3	--	--	**670**	**0.87 J**	**110**	**110**	1.8 U	**13**	2.2 U	2.2 U
Xylenes, m & p	ug/m^3	--	--	**2,600**	4 U	**450**	**470**	3.5 U	**44**	4.5 U	4.5 U
Total Xylenes	ug/m^3	3,500	10,000	**3,270**	**0.87 J**	**560**	**580**	ND	**57**	ND	ND

-- = not applicable; no criteria available

RML = risk management level

RSL = regional screening level

SG = deep soil gas sample

ND = not detected

µg/m^3 = micrograms per cubic meter

VISL = vapor intrusion screening level

Detected results are bolded.

Highlighted results exceed the Residential Soil Gas VISL[a]

Underlined results exceed the Residential Soil Gas RML Equivalent.[b]

[a] The EPA Residential Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a residential exposure scenario with a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Residential Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a residential exposure scenario with a target cancer risk of 10^{-4} and a target hazard quotient of 3 with the exception of trichloroethene which is based on a target hazard quotient of 1.

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 4. Exterior Soil Gas Probe Sampling Results - 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockfor

Compound	Units	Residential Soil Gas VISL[a]	Residential Soil Gas RML Equivalent[b]	SER-SG-78		SER-SG-80		SER-SG-81		SER-SG-82	
				SER-SG-78-0816	SER-SG-78-1216	SER-SG-80-0816	SER-SG-80-1216	SER-SG-81-0816	SER-SG-81-1216	SER-SG-82-0816	SER-SG-82-1216
				8/16/2016	12/1/2016	8/18/2016	12/1/2016	8/18/2016	12/1/2016	8/18/2016	12/1/2016
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	**160**	**89**	**13 J**	**13**	2.1 U	1.9 U	2.2 U	2.4 U
1,1,2-Trichloroethane	ug/m^3	7	21	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
1,1-Dichloroethane	ug/m^3	580	5,800	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
1,1-Dichloroethene	ug/m^3	7,000	21,000	2.2 U	**3.1**	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
1,2-Dichloroethane	ug/m^3	36	360	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
Benzene	ug/m^3	120	1,200	**7.4**	3 U	**250**	**1.3 J**	**49**	1.9 U	**160**	2.4 U
cis-1,2-Dichloroethene	ug/m^3	--	--	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
Ethylbenzene	ug/m^3	370	3,700	**79**	3 U	**850**	**1.5 J**	**180**	1.9 U	**350**	**0.83 J**
Methylene Chloride	ug/m^3	21,000	63,000	**0.89 J**	3 U	14 U	2.4 U	2.1 U	1.9 U	**1.6 J**	2.4 U
Tetrachloroethene	ug/m^3	1,400	4,200	**17**	**13**	**4.7 J**	**0.83 J**	**0.66 J**	1.9 U	**1.7 J**	2.4 U
Toluene	ug/m^3	170,000	520,000	**160 J**	**1.3 J**	**2,300 J**	**3.6**	**440**	1.9 U	**1,500**	**2.6**
trans-1,2-Dichloroethene	ug/m^3	--	--	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
Trichloroethylene	ug/m^3	70	70	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
Vinyl Chloride	ug/m^3	56	560	2.2 U	3 U	14 U	2.4 U	2.1 U	1.9 U	2.2 U	2.4 U
Xylene, o	ug/m^3	--	--	**99**	3 U	**590**	**3.1**	**170**	1.9 U	**280**	**3.6**
Xylenes, m & p	ug/m^3	--	--	**350**	6.1 U	**3,000**	**4.7 J**	**560**	3.9 U	**1,500**	**6.8**
Total Xylenes	ug/m^3	3,500	10,000	**449**	ND	**3,590**	**7.8 J**	**730**	ND	**1,780**	**10.4**

-- = not applicable; no criteria available

RML = risk management level

RSL = regional screening level

SG = deep soil gas sample

ND = not detected

µg/m^3 = micrograms per cubic meter

VISL = vapor intrusion screening level

Detected results are bolded.

Highlighted results exceed the Residential Soil Gas VISL[a]

Underlined results exceed the Residential Soil Gas RML Equivalent.[b]

[a] The EPA Residential Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a residential exposure scenario with a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Residential Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a residential exposure scenario with a target cancer risk of 10^{-4} and a target hazard quotient of 3 with the exception of trichloroethene which is based on a target hazard quotient of 1.

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 5. Subslab Gas Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Soil Gas VISL[a]	Residential Soil Gas RML Equivalent[b]	Commercial Soil Gas VISL[a*]	Commercial Soil Gas RML Equivalent[b*]	Property 3 (Residental)							
						SER-SS-06-0217	SER-SS-06-062017	SER-SS-07-0217	SER-SS-07-062017	SER-SS-07-062017-FD	SER-SS-08-0217	SER-SS-08-0217-FD	SER-SS-08-062017
						2/23/2017	6/8/2017	2/23/2017	6/8/2017	6/8/2017	2/23/2017	2/23/2017	6/8/2017
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	730,000	2,200,000	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
1,1,2-Trichloroethane	ug/m^3	7	21	29	88	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
1,1-Dichloroethane	ug/m^3	580	5,800	2,600	26,000	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
1,1-Dichloroethene	ug/m^3	7,000	21,000	29,000	88,000	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
1,2-Dichloroethane	ug/m^3	36	360	160	1,600	0.94 U	**0.35 J**	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
Benzene	ug/m^3	120	1,200	520	5,200	0.94 U	**0.37 J**	**0.34 J**	0.92 U	0.98 U	0.81 U	0.79 U	1 U
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
Ethylbenzene	ug/m^3	370	3,700	1,600	16,000	**1.2**	**1.7**	**0.29 J**	0.92 U	0.98 U	0.81 U	0.79 U	**0.56 J**
Methylene Chloride	ug/m^3	21,000	63,000	88,000	260,000	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
Tetrachloroethene	ug/m^3	1,400	4,200	5,800	18,000	**4**	**2**	**0.72 J**	**0.82 J**	**0.79 J**	**0.82**	**1.6**	**1.1**
Toluene	ug/m^3	170,000	520,000	730,000	2,200,000	**0.97**	**15**	**0.94**	**1.3**	**1.2**	**0.49 J**	**0.5 J**	**3.5**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
Trichloroethylene	ug/m^3	70	70	290	290	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	**0.77 J**	1 U
Vinyl Chloride	ug/m^3	56	560	930	9,300	0.94 U	0.97 U	0.73 U	0.92 U	0.98 U	0.81 U	0.79 U	1 U
Xylene, o	ug/m^3	--	--	--	--	**0.61 J**	**2.8**	**0.47 J**	**0.35 J**	**0.33 J**	**0.29 J**	**0.26 J**	**0.92 J**
Xylenes, m & p	ug/m^3	--	--	--	--	**1.7 J**	**6.7**	**1.1 J**	**0.86 J**	**0.77 J**	**0.72 J**	**0.64 J**	**2.2**
Total Xylenes	ug/m^3	3,500	10,000	15,000	44,000	**2.31 J**	**9.5**	**1.57 J**	**1.21 J**	**1.1 J**	**1.01 J**	**0.9 J**	**3.12 J**

-- = not applicable; no criteria available

ND = not detected

RML = risk management level

RSL = regional screening level

SS = subslab sample

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Soil Gas VISL.[a or a*]

Underlined results exceed the Residential or Commercial Soil Gas RML Equivalent.[b or b*]

[a] The EPA Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1, (June 2017 RSLs) based on a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 5. Subslab Gas Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Soil Gas VISL[a]	Residential Soil Gas RML Equivalent[b]	Commercial Soil Gas VISL[a*]	Commercial Soil Gas RML Equivalent[b*]	Property 4 (Residental) SER-SS-09-0217 2/23/2017	SER-SS-09-062017 6/8/2017	SER-SS-10-0217 2/23/2017	SER-SS-10-062017 6/8/2017	SER-SS-11-0217 2/23/2017	SER-SS-11-062017 6/8/2017
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	730,000	2,200,000	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
1,1,2-Trichloroethane	ug/m^3	7	21	29	88	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
1,1-Dichloroethane	ug/m^3	580	5,800	2,600	26,000	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
1,1-Dichloroethene	ug/m^3	7,000	21,000	29,000	88,000	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
1,2-Dichloroethane	ug/m^3	36	360	160	1,600	0.79 U	0.97 U	0.76 U	**0.64 J**	0.8 U	0.97 U
Benzene	ug/m^3	120	1,200	520	5,200	0.79 U	0.97 U	**0.32 J**	**0.26 J**	0.8 U	0.97 U
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
Ethylbenzene	ug/m^3	370	3,700	1,600	16,000	**0.43 J**	**1.1**	**0.44 J**	**0.47 J**	**0.37 J**	**1**
Methylene Chloride	ug/m^3	21,000	63,000	88,000	260,000	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
Tetrachloroethene	ug/m^3	1,400	4,200	5,800	18,000	**0.42 J**	**0.29 J**	**0.33 J**	**0.27 J**	**0.32 J**	**0.3 J**
Toluene	ug/m^3	170,000	520,000	730,000	2,200,000	**0.99**	**8.4**	**1.1**	**3.4**	**1**	**3.4**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
Trichloroethylene	ug/m^3	70	70	290	290	0.79 U	0.97 U	**3.6**	**0.23 J**	**0.31 J**	0.97 U
Vinyl Chloride	ug/m^3	56	560	930	9,300	0.79 U	0.97 U	0.76 U	0.68 U	0.8 U	0.97 U
Xylene, o	ug/m^3	--	--	--	--	**0.73 J**	**2**	**0.78**	**0.65 J**	**0.64 J**	**1.8**
Xylenes, m & p	ug/m^3	--	--	--	--	**1.7**	**4.7**	**1.9**	**1.6**	**1.6 J**	**3.2**
Total Xylenes	ug/m^3	3,500	10,000	15,000	44,000	**2.43 J**	**6.7**	**2.68**	**2.25 J**	**2.24 J**	**5**

-- = not applicable; no criteria available

ND = not detected

RML = risk management level

RSL = regional screening level

SS = subslab sample

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Soil Gas VISL.[a or a*]

Underlined results exceed the Residential or Commercial Soil Gas RML Equivalent.[b or b*]

[a] The EPA Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1, (June 2017 RSLs) based on a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 5. Subslab Gas Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Soil Gas VISL[a]	Residential Soil Gas RML Equivalent[b]	Commercial Soil Gas VISL[a*]	Commercial Soil Gas RML Equivalent[b*]	Property 5 (Commercial)[c] SER-SS-01-0816 8/17/2016	SER-SS-01-1116 11/29/2016	SER-SS-02-0816 8/17/2016	SER-SS-02-1116 11/29/2016	SER-SS-03-0816 8/17/2016	SER-SS-03-1116 11/29/2016
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	730,000	2,200,000	**110**	**480**	**800**	**350**	**350**	**330**
1,1,2-Trichloroethane	ug/m^3	7	21	29	88	0.78 U	0.66 U	0.93 U	0.86 U	0.9 U	0.85 U
1,1-Dichloroethane	ug/m^3	580	5,800	2,600	26,000	**29**	**170**	0.93 U	**0.47 J**	**160**	**170**
1,1-Dichloroethene	ug/m^3	7,000	21,000	29,000	88,000	**25**	**340**	**4.2**	**4.9**	**130**	**180**
1,2-Dichloroethane	ug/m^3	36	360	160	1,600	**51**	0.66 U	**5.1**	0.86 U	**0.73 J**	0.85 U
Benzene	ug/m^3	120	1,200	520	5,200	**0.72 J**	**0.64 J**	0.93 U	0.86 U	**0.55 J**	0.85 U
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	**1.6**	**6**	0.93 U	0.86 U	**14**	**13**
Ethylbenzene	ug/m^3	370	3,700	1,600	16,000	**0.68 J**	**0.4 J**	**0.37 J**	0.86 U	**0.41 J**	**0.28 J**
Methylene Chloride	ug/m^3	21,000	63,000	88,000	260,000	**5.8**	0.66 U	**0.68 J**	0.86 U	0.9 U	0.85 U
Tetrachloroethene	ug/m^3	1,400	4,200	5,800	18,000	**110**	**78**	**590**	**190**	**250**	**120**
Toluene	ug/m^3	170,000	520,000	730,000	2,200,000	**22**	**1.3**	**2.7**	**0.6 J**	**2**	**0.98**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	**0.66 J**	**1.9**	0.93 U	0.86 U	**2**	**2**
Trichloroethylene	ug/m^3	70	70	290	290	**200**	**150**	**94**	**26**	**440**	**190**
Vinyl Chloride	ug/m^3	56	560	930	9,300	0.78 U	**0.28 J**	0.93 U	0.86 U	0.9 U	**0.39 J**
Xylene, o	ug/m^3	--	--	--	--	**0.66 J**	**0.8**	**0.49 J**	**0.35 J**	**0.77 J**	**0.5 J**
Xylenes, m & p	ug/m^3	--	--	--	--	**1.7**	**1.7**	**1.2 J**	**0.8 J**	**1.5 J**	**1.2 J**
Total Xylenes	ug/m^3	3,500	10,000	15,000	44,000	**2.36 J**	**2.5**	**1.69 J**	**1.15 J**	**2.27 J**	**1.7 J**

-- = not applicable; no criteria available

ND = not detected

RML = risk management level

RSL = regional screening level

SS = subslab sample

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Soil Gas VISL.[a or a*]

Underlined results exceed the Residential or Commercial Soil Gas RML Equivalent.[b or b*]

[a] The EPA Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1, (June 2017 RSLs) based on a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 5. Subslab Gas Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Soil Gas VISL[a]	Residential Soil Gas RML Equivalent[b]	Commercial Soil Gas VISL[a*]	Commercial Soil Gas RML Equivalent[b*]	Property 6 (Residental)[d] SER-SS-04-0816 8/17/2016	SER-SS-04-1116 11/29/2016	SER-SS-04-062017 6/10/2017	SER-SS-05-0816 8/17/2016	SER-SS-05-0816-FD 8/17/2016	SER-SS-05-1116 11/29/2016	SER-SS-05-1116-FD 11/29/2016	SER-SS-05-062017 6/10/2017
1,1,1-Trichloroethane	ug/m^3	170,000	520,000	730,000	2,200,000	**13,000**	**70**	**160**	**30,000**	**31,000**	**4.8**	**4.6**	**350**
1,1,2-Trichloroethane	ug/m^3	7	21	29	88	92 U	0.83 U	0.95 U	170 U	170 U	0.81 U	0.86 U	1.1 U
1,1-Dichloroethane	ug/m^3	580	5,800	2,600	26,000	92 U	0.83 U	0.95 U	**380**	**390**	**0.41 J**	**0.41 J**	**4.8**
1,1-Dichloroethene	ug/m^3	7,000	21,000	29,000	88,000	**47 J**	**0.84**	**7.7**	**190**	**190**	0.81 U	0.86 U	**63**
1,2-Dichloroethane	ug/m^3	36	360	160	1,600	92 U	0.83 U	0.95 U	170 U	170 U	**0.45 J**	**0.45 J**	1.1 U
Benzene	ug/m^3	120	1,200	520	5,200	92 U	0.83 U	0.95 U	170 U	170 U	**0.3 J**	**0.3 J**	1.1 U
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	92 U	0.83 U	0.95 U	170 U	170 U	0.81 U	0.86 U	**0.41 J**
Ethylbenzene	ug/m^3	370	3,700	1,600	16,000	92 U	**0.86**	**0.56 J**	170 U	170 U	**0.36 J**	**0.39 J**	**0.74 J**
Methylene Chloride	ug/m^3	21,000	63,000	88,000	260,000	92 U	0.83 U	0.95 U	170 U	170 U	**0.95**	**0.94**	1.1 U
Tetrachloroethene	ug/m^3	1,400	4,200	5,800	18,000	**34 J**	**6.5**	**3.8**	**130 J**	**120 J**	**0.41 J**	**0.57 J**	**8.9**
Toluene	ug/m^3	170,000	520,000	730,000	2,200,000	92 U	**2.9**	**2.3**	170 U	170 U	**1.3**	**1.6**	**2.6**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	92 U	0.83 U	0.95 U	170 U	170 U	0.81 U	0.86 U	1.1 U
Trichloroethylene	ug/m^3	70	70	290	290	92 U	**1.4**	**1.8**	**120 J**	**120 J**	**0.29 J**	**0.3 J**	**26**
Vinyl Chloride	ug/m^3	56	560	930	9,300	92 U	0.83 U	0.95 U	170 U	170 U	0.81 U	0.86 U	1.1 U
Xylene, o	ug/m^3	--	--	--	--	92 U	**1.6**	**0.98**	170 U	170 U	**0.7 J**	**0.71 J**	**1.2**
Xylenes, m & p	ug/m^3	--	--	--	--	180 U	**3.6**	**2.2**	330 U	340 U	**1.6 J**	**1.7 J**	**2.8**
Total Xylenes	ug/m^3	3,500	10,000	15,000	44,000	ND	**5.2**	**3.18**	ND	ND	**2.3 J**	**2.41 J**	**4**

-- = not applicable; no criteria available

ND = not detected

RML = risk management level

RSL = regional screening level

SS = subslab sample

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Soil Gas VISL.[a or a*]

Underlined results exceed the Residential or Commercial Soil Gas RML Equivalent.[b or b*]

[a] The EPA Soil Gas VISLs were calculated using the EPA VISL Calculator Version 3.5.1, (June 2017 RSLs) based on a target cancer risk of 10^{-5} and a target hazard quotient of 1.

[b] The EPA Soil Gas RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 6. Indoor and Crawlspace Air Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Indoor Air VISL[a]	Residential Indoor Air RML Equivalent[b]	Commercial Indoor Air VISL[a*]	Commercial Indoor Air RML Equivalent[b*]	Property 3 (Residental) SER-IA-05-0217 Basement 2/23/2017	SER-IA-05-062017 Basement 6/8/2017	SER-IA-06-0217 1st Floor 2/23/2017	SER-IA-06-062017 1st Floor 6/8/2017
1,1,1-Trichloroethane	ug/m^3	5,200	16,000	22,000	66,000	**0.026 J**	**0.11**	**0.021 J**	**0.088 J**
1,1,2-Trichloroethane	ug/m^3	0.21	0.63	0.88	2.6	0.17 U	0.24 U	0.17 U	0.44 U
1,1-Dichloroethane	ug/m^3	18	180	77	770	**0.011 J**	**0.024 J**	**0.011 J**	0.11 U
1,1-Dichloroethene	ug/m^3	210	630	880	2,600	0.042 U	**0.12**	0.042 U	**0.07 J**
1,2-Dichloroethane	ug/m^3	1.1	11	4.7	47	**4**	**6.9**	**9**	**9.6**
Benzene	ug/m^3	3.6	36	16	160	**2.6**	**5**	**3.7**	**6.4**
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.042 U	**0.024 J**	0.042 U	0.11 U
Ethylbenzene	ug/m^3	11	110	49	490	**2.9**	**3.9**	**4.7**	**5.6**
Methylene Chloride	ug/m^3	630	1,900	2,600	7,900	**0.82**	**1.1**	**1.3**	**1.2**
Tetrachloroethene	ug/m^3	42	130	180	530	**0.46**	**0.88**	**0.73**	**0.98**
Toluene	ug/m^3	5,200	16,000	22,000	66,000	**13**	**22**	**21**	**29**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.042 U	**0.037 J**	**0.014 J**	**0.033 J**
Trichloroethylene	ug/m^3	2.1	2.1	8.8	8.8	**0.22 J**	**0.68**	**0.65 J**	**0.81**
Vinyl Chloride	ug/m^3	1.7	17	28	280	0.042 U	0.06 U	0.042 U	0.11 U
Xylene, o	ug/m^3	--	--	--	--	**4 J**	**5.3**	**6.5 J**	**7.5**
Xylenes, m & p	ug/m^3	--	--	--	--	**9.9**	**12**	**16**	**18**
Total Xylenes	ug/m^3	100	310	440	1,300	**13.9 J**	**17.3**	**22.5 J**	**25.5**

-- = not applicable; no criteria available

ND = not detected

IA = indoor air sample

CS = crawlspace air sample

RML = risk management level

RSL = regional screening level

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Indoor Air VISL.[a or a*]

Underlined results exceed the Residential or Commercial Indoor Air RML Equivalent.[b or b*]

[a] The EPA Indoor Air VISLs were calculated using the EPA VISL Calculator 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-5} and target hazard quotient of 1.

[b] The EPA Indoor Air RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

UJ = The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC.

Table 6. Indoor and Crawlspace Air Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Residential Indoor Air VISL[a]	Residential Indoor Air RML Equivalent[b]	Commercial Indoor Air VISL[a*]	Commercial Indoor Air RML Equivalent[b*]	Property 4 (Residental) SER-IA-07-0217 Basement 2/23/2017	SER-IA-07-0217-FD Basement 2/23/2017	SER-IA-07-062017 Basement 6/8/2017	SER-IA-08-0217 1st Floor 2/23/2017	SER-IA-08-062017 1st Floor 6/8/2017	Property 5 (Commercial)[c] SER-IA-01-0816 1st Floor 8/17/2016	SER-IA-02-0816 1st Floor 8/17/2016
1,1,1-Trichloroethane	ug/m^3	5,200	16,000	22,000	66,000	**0.022 J**	**0.023 J**	**0.1**	**0.021 J**	**0.1**	**0.12**	**0.12**
1,1,2-Trichloroethane	ug/m^3	0.21	0.63	0.88	2.6	0.15 U	0.16 U	0.21 U	0.16 U	0.22 U	0.17 U	0.17 U
1,1-Dichloroethane	ug/m^3	18	180	77	770	**0.017 J**	**0.015 J**	**0.025 J**	**0.019 J**	**0.019 J**	**0.033 J**	**0.035 J**
1,1-Dichloroethene	ug/m^3	210	630	880	2,600	0.038 U	0.039 U	0.053 U	0.04 U	0.056 U	**0.016 J**	**0.016 J**
1,2-Dichloroethane	ug/m^3	1.1	11	4.7	47	**1.4**	**1.5**	**2.3**	**2.2**	**3.5**	**0.058**	**0.18**
Benzene	ug/m^3	3.6	36	16	160	**0.77**	**0.77 J**	**0.84**	**0.81 J**	**0.72**	**0.57**	**0.63**
cis-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.038 U	0.039 U	**0.021 J**	0.04 U	**0.024 J**	**0.017 J**	**0.017 J**
Ethylbenzene	ug/m^3	11	110	49	490	**0.72**	**0.66**	**0.74**	**0.5**	**1.2**	**0.5**	**0.82**
Methylene Chloride	ug/m^3	630	1,900	2,600	7,900	**0.72 J**	**0.51 J**	**0.42**	**0.54**	**0.78**	**0.23**	**0.39**
Tetrachloroethene	ug/m^3	42	130	180	530	**0.29**	**0.31**	**0.36**	**0.35**	**0.4**	**0.23**	**0.25**
Toluene	ug/m^3	5,200	16,000	22,000	66,000	**3.6**	**3.5**	**7**	**3.3**	**9.1**	**4.3**	**5.5**
trans-1,2-Dichloroethene	ug/m^3	--	--	--	--	0.038 U	0.039 U	**0.035 J**	0.04 U	**0.037 J**	0.043 U	0.042 U
Trichloroethylene	ug/m^3	2.1	2.1	8.8	8.8	**0.017 J**	**0.018 J**	**0.28**	**0.017 J**	**0.62**	**0.2**	**0.2**
Vinyl Chloride	ug/m^3	1.7	17	28	280	0.038 U	0.039 U	0.053 U	0.04 U	0.056 U	0.043 U	0.042 U
Xylene, o	ug/m^3	--	--	--	--	**0.6 J**	**0.53**	**0.81**	**0.5**	**1.5**	**0.56**	**0.75**
Xylenes, m & p	ug/m^3	--	--	--	--	**1.8**	**1.5**	**1.9**	**1.3**	**3.4**	**1.5**	**2.1**
Total Xylenes	ug/m^3	100	310	440	1,300	**2.4 J**	**2.03**	**2.71**	**1.8**	**4.9**	**2.06**	**2.85**

-- = not applicable; no criteria available

ND = not detected

IA = indoor air sample

CS = crawlspace air sample

RML = risk management level

RSL = regional screening level

VISL = vapor intrusion screening level

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

Highlighted results exceed the Residential or Commercial Indoor Air VISL.[a or a*]

Underlined results exceed the Residential or Commercial Indoor Air RML Equivalent.[b or b*]

[a] The EPA Indoor Air VISLs were calculated using the EPA VISL Calculator 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-5} and target hazard quotient of 1.

[b] The EPA Indoor Air RMLs were calculated using the EPA VISL Calculator Version 3.5.1 (June 2017 RSLs) based on a target cancer risk of 10^{-4} and a target hazard quotient of 3, with the exception of trichloroethene which is based on a target hazard quotient of 1.

[c]Property 5 was previously identified as the commercial property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

[d]Property 6 was previously identified as the residental property in the Uniform Federal Policy Quality Assurance Project Plan Addendum II (CH2M 2016b)

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

UJ = The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC.

Table 7. Outdoor Air Sampling Results - August 2016 to June 2017

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	Property 3 (Residental)				Property 4 (Residental)		Property 5 (Commercial)[a]		Property 6 (Residental)[b]				
		SER-OA-03-0217	SER-OA-03-0217-FD	SER-OA-03-062017	SER-OA-03-062017-FD	SER-OA-04-0217	SER-OA-04-062017	SER-OA-02-0816	SER-OA-02-1116	SER-OA-01-0816	SER-OA-01-0816-FD	SER-OA-01-1116	SER-OA-01-1116-FD	SER-OA-01-062017
		2/23/2017	2/23/2017	6/8/2017	6/8/2017	2/23/2017	6/8/2017	8/17/2016	11/29/2016	8/17/2016	8/17/2016	11/29/2016	11/29/2016	6/10/2017
1,1,1-Trichloroethane	ug/m^3	**0.023 J**	**0.023 J**	**0.14**	**0.13**	**0.023 J**	**0.14**	**0.06**	**0.014 J**	**0.34**	**0.36**	**0.022 J**	**0.022 J**	**0.037 J**
1,1,2-Trichloroethane	ug/m^3	0.16 U	0.15 U	0.14 U	0.23 U	0.15 U	0.22 U	0.18 U	0.16 U	0.17 U	0.17 U	0.15 U	0.16 U	0.17 U
1,1-Dichloroethane	ug/m^3	**0.0097 J**	**0.01 J**	**0.02 J**	**0.019 J**	**0.01 J**	**0.018 J**	0.045 U	0.04 U	**0.062**	**0.062**	**0.032 J**	**0.033 J**	**0.017 J**
1,1-Dichloroethene	ug/m^3	0.039 U	0.038 U	0.036 U	0.057 U	0.039 U	0.056 U	0.045 U	0.04 U	0.043 U	0.042 U	**0.023 J**	**0.024 J**	0.044 U
1,2-Dichloroethane	ug/m^3	**0.058**	**0.059**	**0.053 J**	**0.091 J**	**0.06**	**0.059**	**0.47**	**0.074**	**8.1**	**0.062**	**0.093**	**0.094**	**0.051**
Benzene	ug/m^3	**0.53**	**0.55**	**0.3 J**	**0.47 J**	**0.49 J**	**0.29**	**0.29**	**0.45**	**0.93**	**0.57**	**0.4**	**0.4**	**0.42**
cis-1,2-Dichloroethene	ug/m^3	0.039 U	0.038 U	**0.015 J**	0.057 U	0.039 U	**0.045 J**	0.045 U	0.04 U	0.043 U	0.042 U	0.038 U	0.039 U	0.044 U
Ethylbenzene	ug/m^3	**0.14 J**	**0.14 J**	**0.23 J**	**1.1 J**	**0.14 J**	**0.56**	**0.17 J**	**0.16**	**1.3**	**0.62**	**0.15 J**	**0.14 J**	**0.47**
Methylene Chloride	ug/m^3	**0.32**	**0.33**	**0.3 J**	**0.68 J**	**0.34**	**0.37**	**0.27**	**0.25**	**2.1**	**0.54**	**0.6**	**0.63**	**0.42**
Tetrachloroethene	ug/m^3	**0.074**	**0.066**	**0.17 J**	**0.25 J**	**0.061**	**0.19**	**0.46**	**0.044**	**0.75**	**0.76**	**0.078**	**0.08**	**0.16**
Toluene	ug/m^3	**0.78**	**0.79**	**1.4 J**	**5.5 J**	**0.8**	**2.4**	**1.6**	**1.1**	**27**	**3**	**1**	**1**	**2.4**
trans-1,2-Dichloroethene	ug/m^3	**0.022 J**	**0.021 J**	**0.011 J**	**0.023 J**	0.039 U	**0.021 J**	0.045 U	0.04 U	**0.081**	0.042 U	0.038 U	0.039 U	0.044 U
Trichloroethylene	ug/m^3	**0.029 J**	0.038 U	**0.56**	**0.53**	0.039 U	**0.55**	0.045 U	0.04 U	**0.088**	**0.022 J**	**0.036 J**	0.039 U	**0.058**
Vinyl Chloride	ug/m^3	0.039 U	0.038 U	0.036 U	0.057 U	0.039 U	0.056 U	0.045 U	0.04 U	0.043 U	0.042 U	0.038 U	0.039 U	0.044 U
Xylene, o	ug/m^3	**0.17 J**	**0.16 J**	**0.31 J**	**1.7 J**	**0.16**	**0.91**	**0.19**	**0.16**	**1.3**	**0.87**	**0.21**	**0.19**	**0.64**
Xylenes, m & p	ug/m^3	**0.43**	**0.43**	**0.69 J**	**3.3 J**	**0.42**	**1.7**	**0.46**	**0.47**	**3.5**	**2.3**	**0.53**	**0.51**	**1.7**
Total Xylenes	ug/m^3	**0.6 J**	**0.59 J**	**1 J**	**5 J**	**0.58**	**2.61**	**0.65**	**0.63**	**4.8**	**3.17**	**0.74**	**0.7**	**2.34**

OA = outdoor air sample

µg/m^3 = micrograms per cubic meter

Detected results are bolded.

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Table 8. Helium Sampling Results - August 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	SER-SG-80
		SER-SG-80-0816
		8/18/2016
Helium	ppmv	**90**

Note: A helium sample was collected at SG-80 during August 2016 sampling because it failed the helium-leak test, and methane interference was suspected.

SG = deep soil gas sample

ppmv = parts per million by volume

Detected results are bolded.

Figures

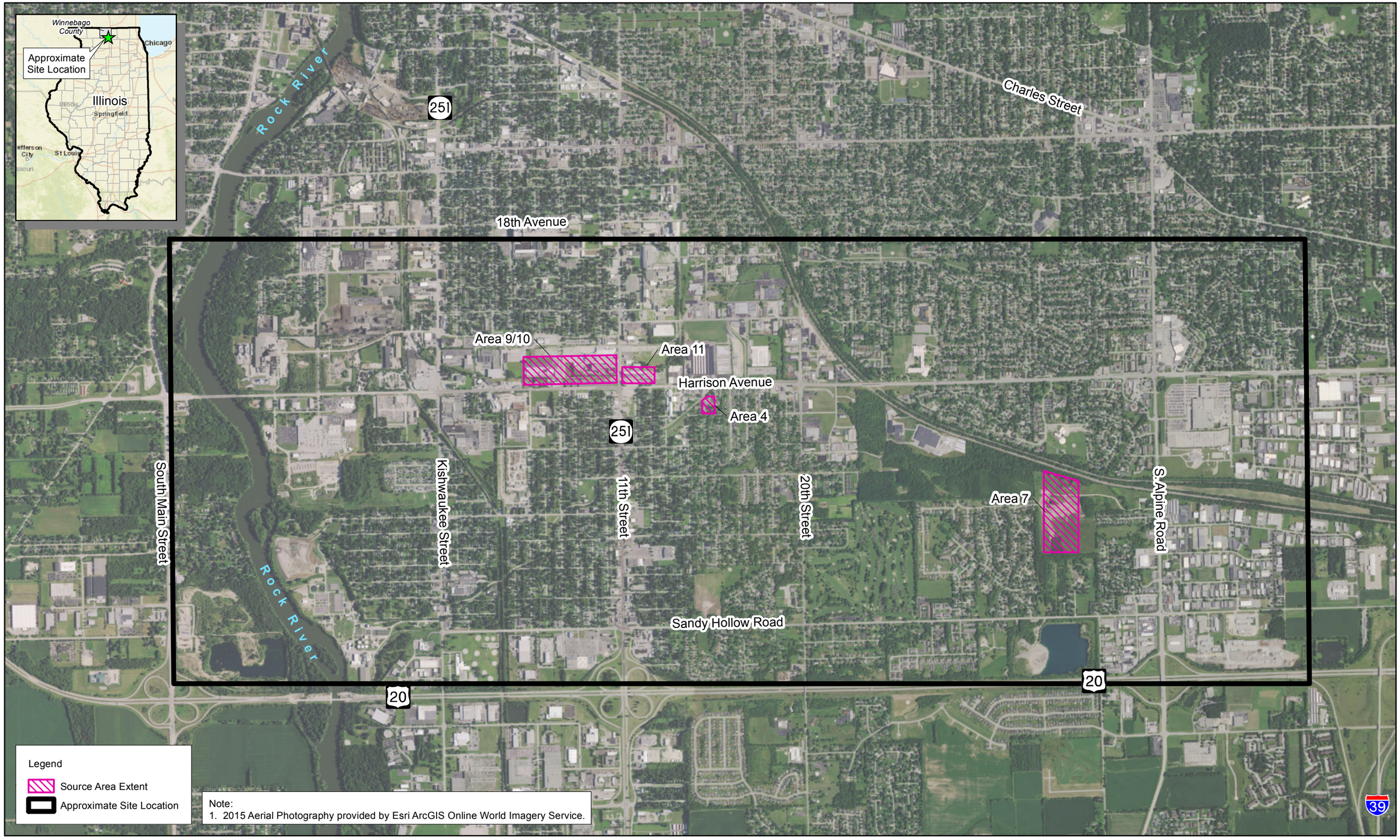


Figure 1
Site Location
Southeast Rockford Groundwater Contamination Superfund Site
Rockford, IL

MKE \\LAKEFRONT\PROJ\EPA\476243SOUTHEASTROCKFORD\MAPFILES\2017\JULY2017\FIGURE 1 - SITE LOCATION MAP.MXD JHANSEN1 7/21/2017 1:48:40 PM

non-responsive

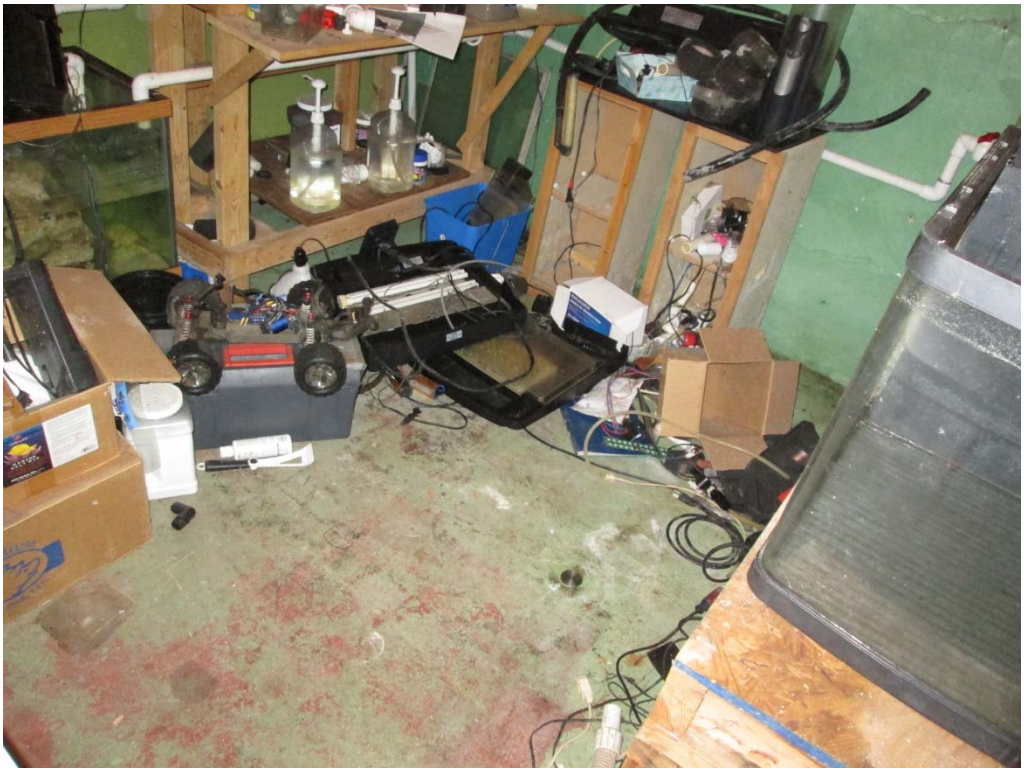
non-responsive

non-responsive

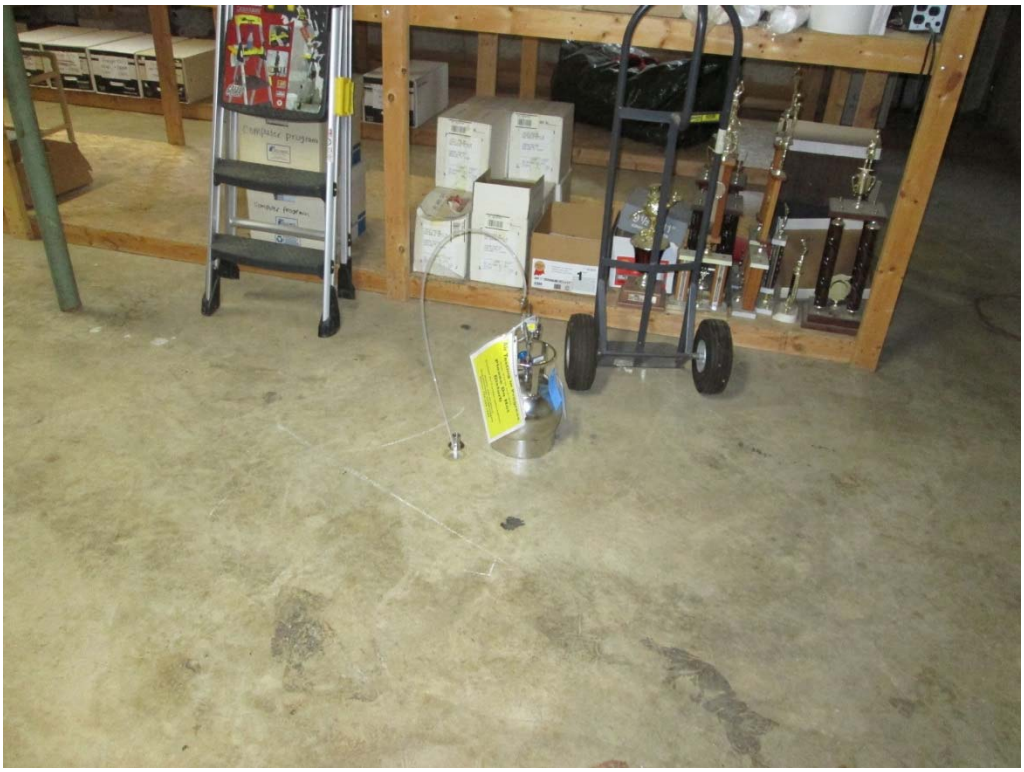
Attachment 1
Photographic Log

ATTACHMENT 1

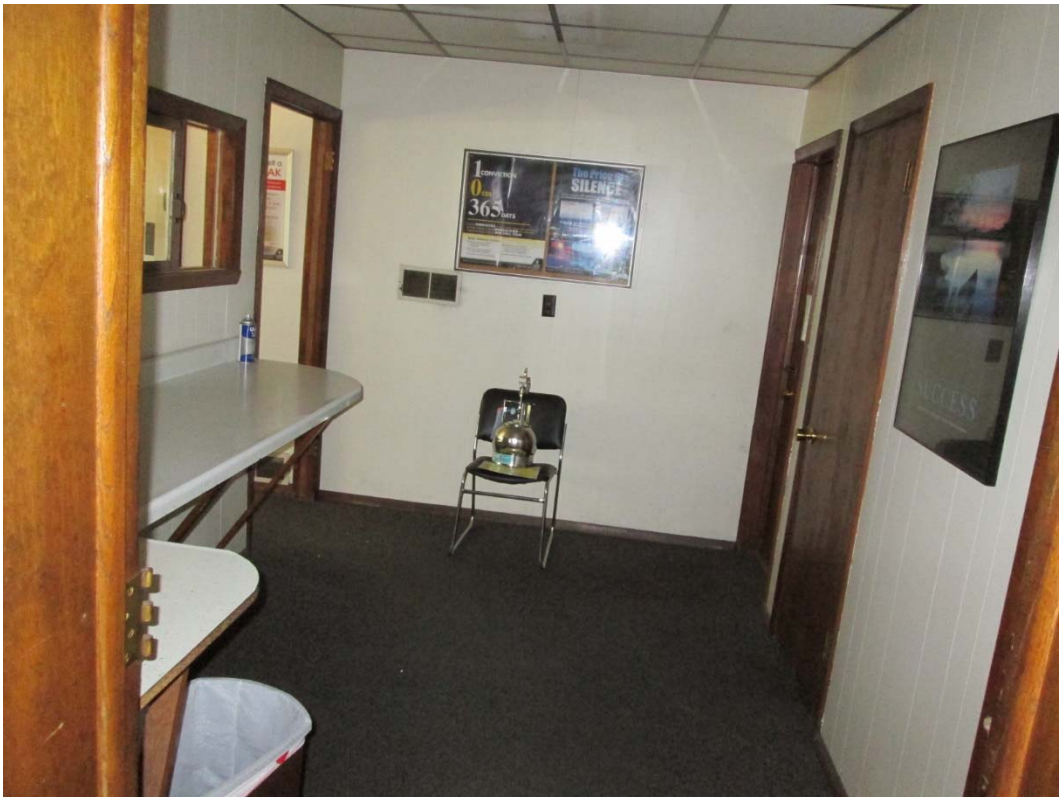
Photographic Log



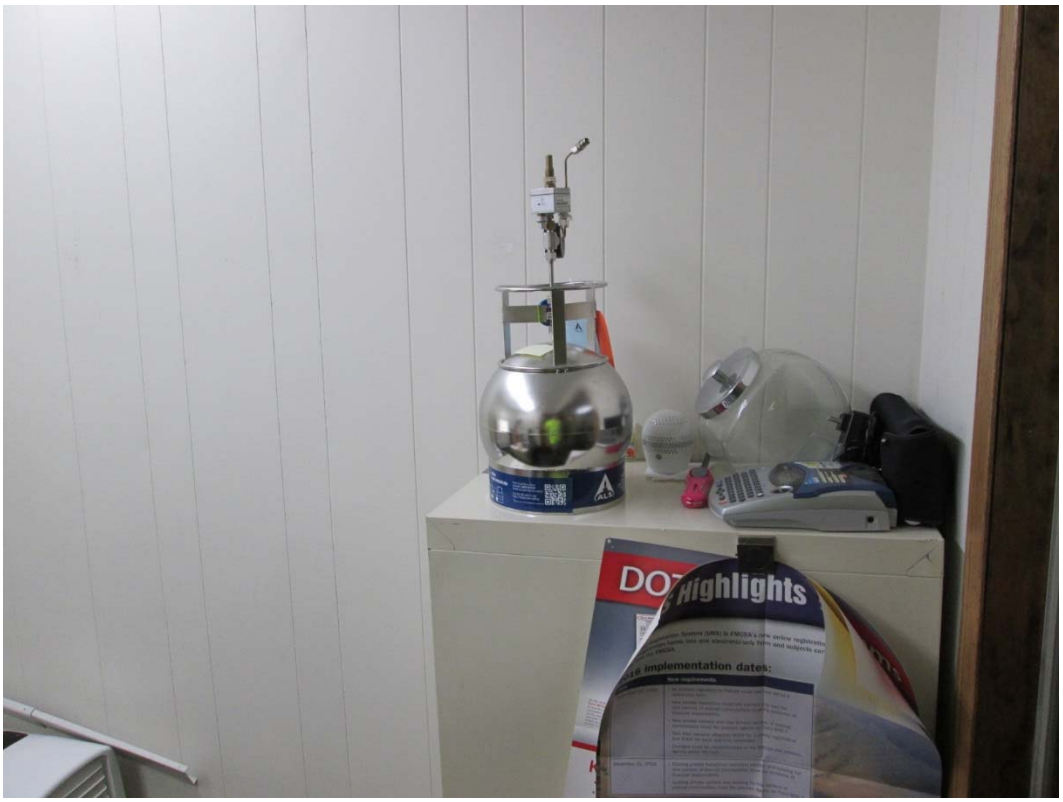
Photograph 001: Completed subslab probe SER-SS-05 at the residential property sampled in August 2016.



Photograph 002: Subslab sampling canister set up at the commercial property sampled in August 2016.



Photograph 003: Indoor air sampling location set-up at the commercial property sampled in August 2016.



Photograph 004: Indoor air sampling location set-up at the commercial property sampled in August 2016.

Photograph 005: Outdoor air sampling location set-up at the commercial property sampled in August 2016.

Photograph 006: Proposed location for exterior soil gas probe SG-77.

Photograph 007: Marking utility locations at exterior soil gas probe location SG-81.

Photograph 008: Installation of exterior soil gas probe at SG-78.

Photograph 009: Soil cores collected from exterior soil gas probe location SG-75.

Photograph 010: Soil cores collected from exterior soil gas probe location SG-77.

Photograph 011: Soil cores collected from exterior soil gas probe location SG-79.

Photograph 012: Completed exterior soil gas probe installation at location SG-81, awaiting completion with concrete pad.

Photograph 013: Completed concrete pad at exterior soil gas probe location SG-81.

Photograph 014: Completed exterior soil gas probe location SG-78.

Attachment 2
Soil Boring Logs

PROJECT NUMBER:	BORING NUMBER:
678601	SB-75 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : Geoprobe 6610DT LOGGER : [redacted]

WATER LEVELS : ▼ 7.5 START : 8/12/16 12:05 END : 8/12/16 12:20 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0	0.0				0.0'-2.4' SILTY TOPSOIL (ML) - moist, soft, black	PID: 0.0 ppm
		2.4	MC - 1		2.4'-5.0' No Recovery	PID: 0.0 ppm
5	5.0				5.0'-8.0' SILT (ML) - moist, soft, brownish tan	PID: 0.0 ppm
		3.0	MC - 2		Saturated at 7.5' bgs	PID: 0.0 ppm ▼
					8.0'-10.0' No Recovery	PID: 0.0 ppm
10	10.0				10.0'-13.1' SILT (ML) - saturated, soft, brownish tan	PID: 0.0 ppm
		3.1	MC - 3			PID: 0.0 ppm
						PID: 0.0 ppm
					13.1'-15.0' No Recovery	PID: 0.0 ppm
15	15.0				End of Boring at 15.0' bgs Saturated Conditions Encountered at 7.5' bgs	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
20						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-77 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site — PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured — DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : Geoprobe 6610DT — LOGGER : [redacted]

WATER LEVELS : ▼ 21.9 — START : 8/12/16 09:25 — END : 8/12/16 10:30 — EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.0					0.0'-0.8' SILTY TOPSOIL (ML) - moist, soft, brown, some roots	
					0.8'-2.1' LEAN CLAY (CL) - moist, soft, black to brown, trace silt	PID: 0.0 ppm
	2.1	MC - 1			2.1'-4.0' No Recovery	PID: 0.0 ppm
4.0						
5					4.0'-6.1' SANDY CLAY (CL) - moist, soft, brown, trace gravel, trace silt	PID: 0.0 ppm
						PID: 0.0 ppm
	2.1	MC - 2			very sandy at 5.9' bgs	PID: 0.0 ppm
8.0					6.1'-8.0' No Recovery	
					8.0'-8.5' CLAYEY SAND (SC) to SANDY CLAY (CL) - moist, firm, brown	PID: 0.0 ppm
10					8.5'-10.4' SANDY CLAY (CL) - moist, firm, brown, trace gravel, with mottles	PID: 0.0 ppm
	2.4	MC - 3				PID: 0.0 ppm
12.0					10.4'-12.0' No Recovery	
					12.0'-15.8' LEAN CLAY (CL) - moist, firm to stiff, grayish brown, trace gravel, trace sand	PID: 0.0 ppm
					sandy at 12.0 and 12.4' bgs	PID: 0.0 ppm
	3.8	MC - 4				PID: 0.0 ppm
15						PID: 0.0 ppm
16.0					15.8'-16.0' No Recovery	
					16.0'-19.8' POORLY GRADED SAND (SP) - dry, loose, brown, with gravel	PID: 0.0 ppm
						PID: 0.0 ppm
	3.8	MC - 5			rust mottles from 17.4'-18.3' bgs	PID: 0.0 ppm
20						PID: 0.0 ppm
20.0					19.8'-20.0' No Recovery	
					20.0'-22.7' POORLY GRADED SAND (SP) - dry, loose, brown, with gravel	PID: 0.0 ppm
					gravelly at 20.9' bgs	PID: 0.0 ppm
	4.3	MC - 6			wet at 21.9' bgs	PID: 0.0 ppm
					22.7'-23.6' LEAN CLAY (CL) - moist, hard, gravelly, mottled	PID: 0.0 ppm
24.3					23.6'-24.3' POORLY GRADED SAND (SP) - moist to wet, dense, brown, with gravel, mottled	PID: 0.0 ppm
25					End of Boring at 24.3' bgs Saturated Conditions Encountered at 21.9' bgs	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
30						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-78 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : 2.0" O.D. Hand Auger LOGGER : [redacted]

WATER LEVELS : ▼ N/A START : 8/11/16 09:56 END : 8/11/16 10:50 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.0					0.0'-1.0' SILTY TOPSOIL (ML) - moist, black, trace clay, some roots	
					1.0'-6.5' LEAN CLAY (CL) - moist, black, trace sand, trace silt	PID: 0.0 ppm
						PID: 0.0 ppm
						PID: 0.0 ppm
						PID: 0.0 ppm
5						PID: 0.0 ppm
		11.6	HC - 1		turns brownish black at 6.0' bgs	PID: 0.0 ppm
					6.5'-8.0' LEAN CLAY (CL) - moist, brown, silty, trace sand sand content increases with depth	PID: 0.0 ppm
					8.0'-10.0' SANDY CLAY (CL) interbedded with CLAYEY SAND (SC) - moist, brown, trace silt	PID: 0.0 ppm
						PID: 0.0 ppm
10						
					10.0'-10.9' - GRAVELLY SAND (SP) - moist, brown, clayey, with coarse gravel	PID: 0.0 ppm switched to 2" O.D. Hand Auger
					10.9'-11.6' POORLY GRADED FINE SAND - moist, brown, trace gravel Interbedded with sandy clay with gravel	PID: 0.0 ppm
11.6					End of Hand Auger at 11.6' bgs (refusal on rock) Saturated Conditions Not Encountered	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
15						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-79 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : Geoprobe 6610DT LOGGER : [redacted]

WATER LEVELS : ▼ 21.0 START : 8/12/16 09:45 END : 8/12/16 11:45 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.0					0.0'-1.4' SILTY TOPSOIL (ML) - dry, firm, dark brown, sandy, trace gravel, roots	PID: 0.0 ppm
	5.0	MC - 1			1.4'-19.0' SILT (ML) - dry, brown, clayey, trace sand, trace fine angular gravel	PID: 0.0 ppm PID: 0.0 ppm PID: 0.0 ppm
5 5.0						PID: 0.0 ppm
	5.0	MC - 2			gravelly from 5.9'-6.2' bgs very sandy from 7.5'-7.7' bgs gravelly from 7.8'-8.1' bgs	PID: 0.0 ppm PID: 0.0 ppm PID: 0.0 ppm PID: 0.0 ppm
10 10.0						PID: 0.0 ppm
	3.0	MC - 3				PID: 0.0 ppm PID: 0.0 ppm
13.0					gravelly at 12.5' bgs	
	3.0	MC - 4				PID: 0.0 ppm PID: 0.0 ppm
15 16.0					gravelly at 15.0' bgs	PID: 0.0 ppm
	3.0	MC - 5				PID: 0.0 ppm PID: 0.0 ppm PID: 0.0 ppm
19.0						
20	3.0	MC - 6			19.0'-22.0' SILT (ML) - dry, brown, some fine sand, trace gravel	PID: 0.0 ppm PID: 0.0 ppm
22.0					wet at 21.0' bgs	▼ PID: 0.0 ppm PID: 0.0 ppm
					End of Boring at 22.0' bgs Saturated Conditions Encountered at 21.0' bgs	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
25						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-80 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : 2.5" O.D. Hand Auger, Geoprobe 6610DT LOGGER : [redacted]

WATER LEVELS : ▼ 13.6 START : 8/11/16 14:00 END : 8/12/16 09:25 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0	0.0	10.0	HC - 1		0.0'-2.0' SILTY TOPSOIL (ML) - dry, soft, black, some sand	PID: 0.0 ppm
					2.0'-4.0' SANDY LEAN CLAY (CL) - moist, soft, brownish black, some silt color changing to brown depth	PID: 0.0 ppm PID: 0.0 ppm
5					4.0'-7.0' SANDY LEAN CLAY (CL) - moist, firm, brown	PID: 0.0 ppm PID: 0.0 ppm
					very sandy at 6.0' bgs	PID: 0.0 ppm
					7.0'-10.0' CLAYEY SAND (SC) - moist, brown, gravelly	PID: 0.0 ppm PID: 0.0 ppm PID: 0.0 ppm
10	10.0	4.0	MC - 1		10.0'-10.8' POORLY GRADED SAND with CLAY (SP-SC) - moist, brown, gravelly, trace clay	Hand Auger refusal on rock, switch to Geoprobe, PID: 0.0 ppm
					10.8'-11.3' LEAN CLAY (CL) - moist, firm, brown, gravelly, trace sand	PID: 0.0 ppm
					11.3'-14.0' WELL GRADED SAND (SW) - moist, firm, brown, trace gravel, trace clay	PID: 0.0 ppm
					saturated at 13.6' bgs	PID: 0.0 ppm ▼
15	15.0				14.0'-15.0' No Recovery	
		5.0	MC - 2		15.0'-16.9' SILT (ML) - saturated, stiff, brown, trace clay	PID: 0.0 ppm PID: 0.0 ppm
					16.9'-17.7' CLAYEY SAND (SC) - saturated, firm, brown, gravelly	PID: 0.0 ppm
					17.7'-18.8' LEAN CLAY (CL) - stiff, reddish brown, trace gravel	PID: 0.0 ppm
					18.8'-20.0' CLAYEY SAND (SC) - saturated, stiff, brown, trace gravel clay layer from 19.1'19.3' bgs	PID: 0.0 ppm PID: 0.0 ppm
20	20.0				End of Boring at 20.0' bgs Saturated Conditions Encountered at 13.6' bgs	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
25						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-81 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : 2.5" O.D. Hand Auger LOGGER : [redacted]

WATER LEVELS : ▼ 9.5 START : 8/11/16 07:50 END : 8/11/16 09:00 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.0					0.0'-1.5' SILTY TOPSOIL (ML) - dry, black, trace sand, roots	PID: 0.0 ppm
					1.5'-4.0' LEAN CLAY (CL) - moist, black, silty, trace sand color changing to brown depth	PID: 0.0 ppm PID: 0.0 ppm
					4.0'-6.5' LEAN CLAY (CL) - moist, brown to tan, trace gravel	PID: 0.0 ppm
5	10.2		HC - 1		sandy at 5.0' bgs	PID: 0.0 ppm
					very sandy at 6.5' bgs	PID: 0.0 ppm
					6.5'-7.5' FINE SANDY CLAY (SC) - moist, brown	PID: 0.0 ppm
					7.5'-8.0' POORLY GRADED FINE SAND (SP) - moist, brown	
					8.0'-8.5' LEAN CLAY (CL) - moist, brown, sandy	PID: 0.0 ppm
					8.5'-10.2' WELL GRADED SAND (SW) - moist, brown interbedded with sandy lean clay	PID: 0.0 ppm
10					saturated at 9.5' bgs	
10.2					End of Hand Auger at 10.2' bgs (refusal) Saturated Conditions Encountered at 9.5' bgs	PID: 0.0 ppm Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
15						

PROJECT NUMBER:	BORING NUMBER:
678601	SB-82 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : SE Rockford Groundwater Contamination Superfund Site PROJECT LOCATION: Rockford, Illinois

ELEVATION : Not Measured DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING EQUIPMENT AND METHOD : 2.5" O.D. Hand Auger LOGGER : [redacted]

WATER LEVELS : ▼ N/A START : 8/10/16 13:55 END : 8/10/16 15:30 EDITOR : [redacted]

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	SYMBOLIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0	0.0				0.0'-1.5' SILTY TOPSOIL (ML) - moist, firm, brownish black color lightens with depth	PID: 0.0 ppm
					1.5'-15.6' LEAN CLAY (CL) - moist, firm, brown, trace gravel	PID: 0.0 ppm
						PID: 0.0 ppm
					sandy with trace gravel at 4.0' bgs	PID: 0.0 ppm
5					some gravel at 5.0' bgs	PID: 0.0 ppm
					large gravel chunk at 6.0' bgs	PID: 0.0 ppm
						PID: 0.0 ppm
		15.6	HC - 1			PID: 0.0 ppm
					gravelly at 9.0' bgs	PID: 0.0 ppm
10						PID: 0.0 ppm
						PID: 0.0 ppm
					sandy and silty from 12.0'-13.0 bgs	PID: 0.0 ppm
						PID: 0.0 ppm
					sandy from 14.0'-15.0' bgs	PID: 0.0 ppm
15						PID: 0.0 ppm
	15.6				End of Hand Auger at 15.6' bgs Saturated Conditions not Encountered	Abbreviations: HC - Hand Auger Core MC - DPT Macro Core
20						

Attachment 3
Soil Gas Probe Construction Logs

PROJECT NUMBER	PROBE NUMBER	SG-74
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

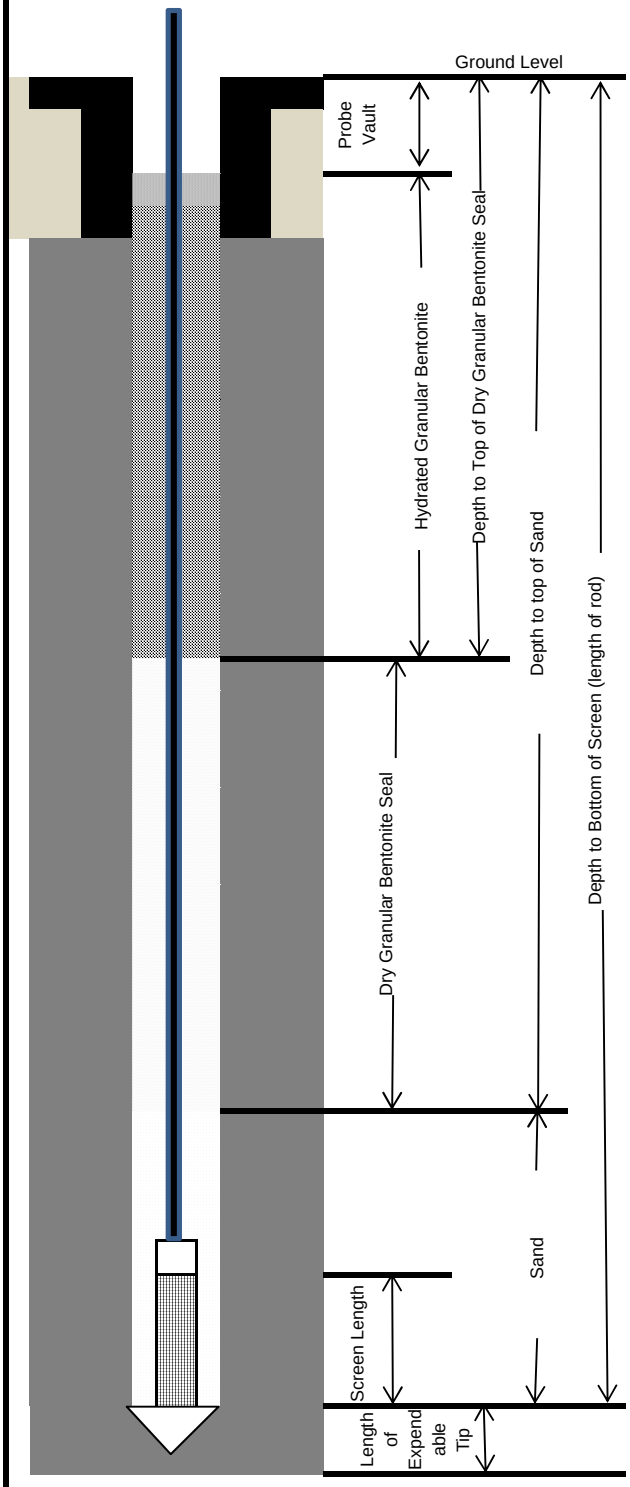
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 6620DT 2.25 inch outer diameter rods

START : 8/12/2016 12:55 END: 8/12/2016 13:25 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	11.8
(2)Depth to Top of Sand (ft. bgs)	10.9
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	5.9
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of Sand (ft.)	0.9
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	5.1
Screen Diameter (in.) / Length (ft.)	0.5" / 0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	No
Sand Backfill (ft. bgs)	2.1

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-75
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

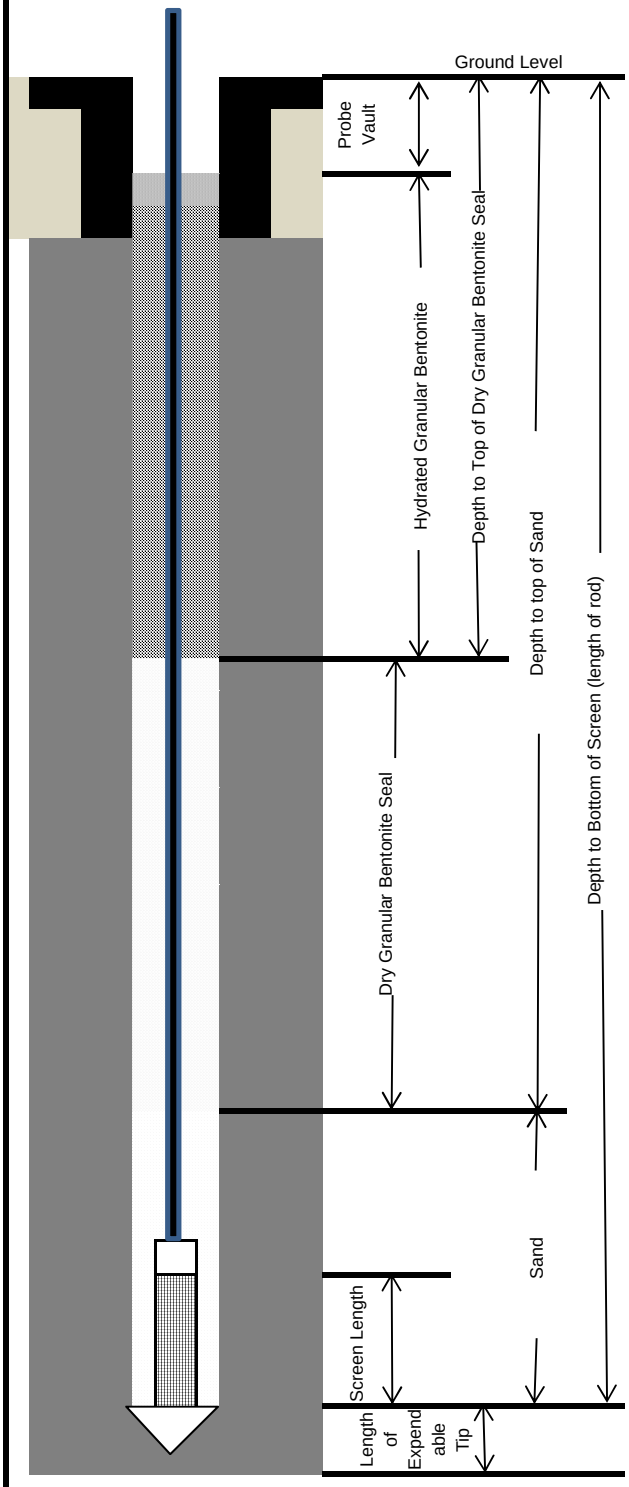
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 6620DT 2.25 inch outer diameter rods

START : 8/12/2016 12:05 END: 8/12/2016 12:35 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	5.8
(2)Depth to Top of Sand (ft. bgs)	4.9
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	3.9
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of Sand (ft.)	0.9
(2-3) Length of Dry Granular Bentonite Seal (ft.)	1.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	3.1
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	9.0

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-76
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

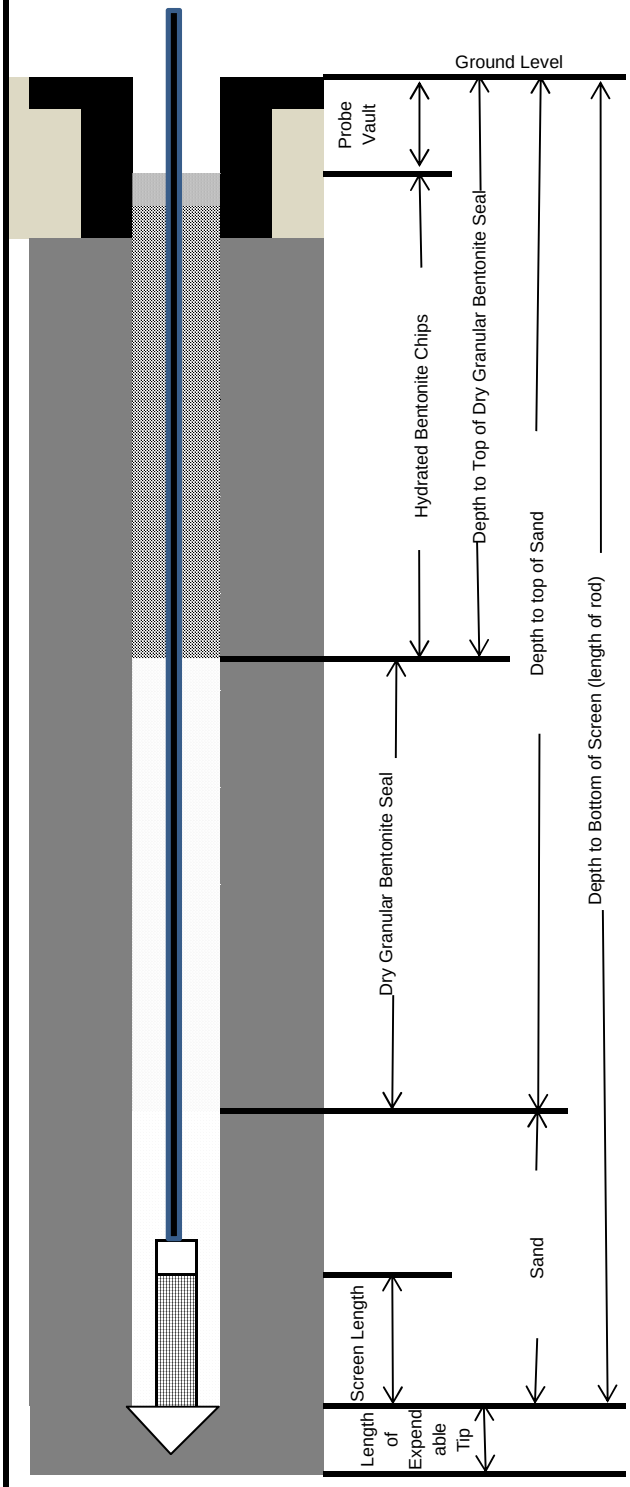
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 6620DT 2.25 inch outer diameter rods

START : 8/12/2016 13:40 END: 8/12/2016 14:25 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	15.0
(2)Depth to Top of Sand (ft. bgs)	14.0
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	9.0
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of Sand (ft.)	1.0
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Bentonite Seal (ft.)	8.2
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	No
Sand Backfill (ft. bgs)	1.5

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-77
678601.ET.01	SHEET 1 OF 1	DATE: 8/10/2016

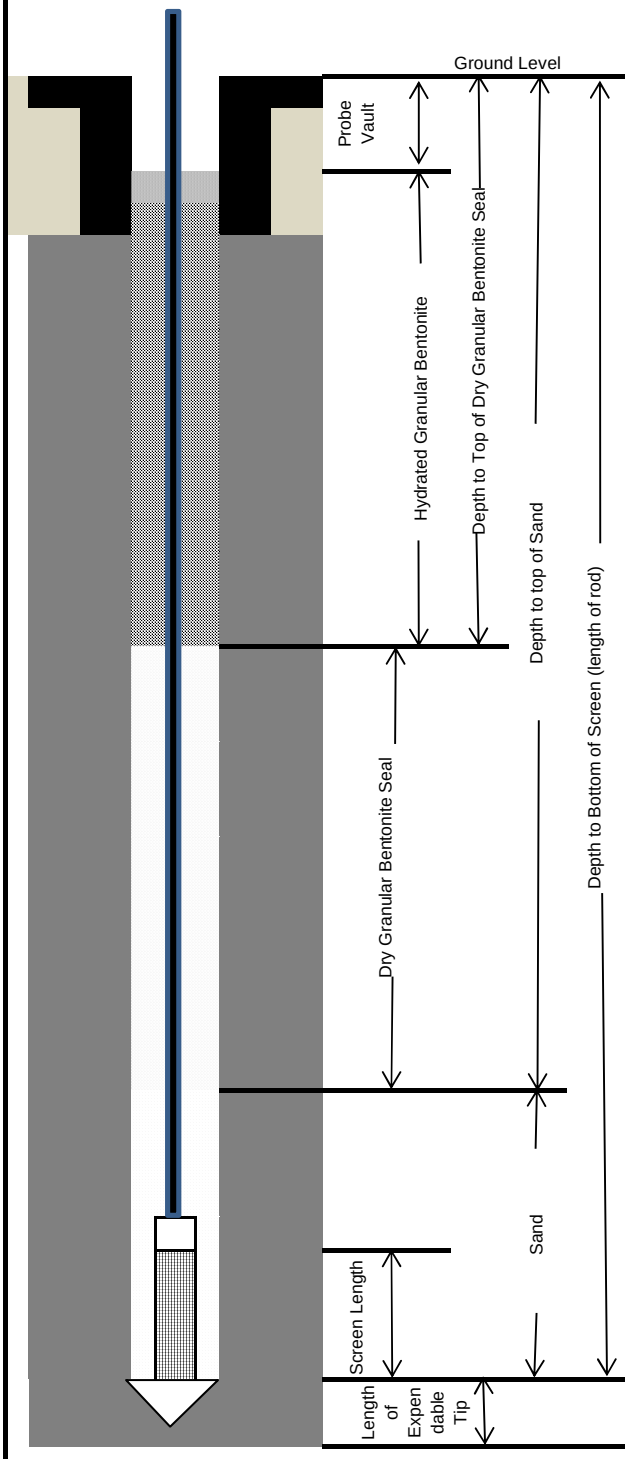
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 6610DT 2.25 inch outer diameter rods

START : 8/10/2016 9:25 END: 8/10/2016 12:20 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	16.4
(2)Depth to Top of Sand (ft. bgs)	15.3
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	10.4
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	1.1
(2-3) Length of Dry Granular Bentonite Seal (ft.)	4.9
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	9.6
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	7.7

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-78
678601.ET.01	SHEET 1 OF 1	DATE: 8/11/2016

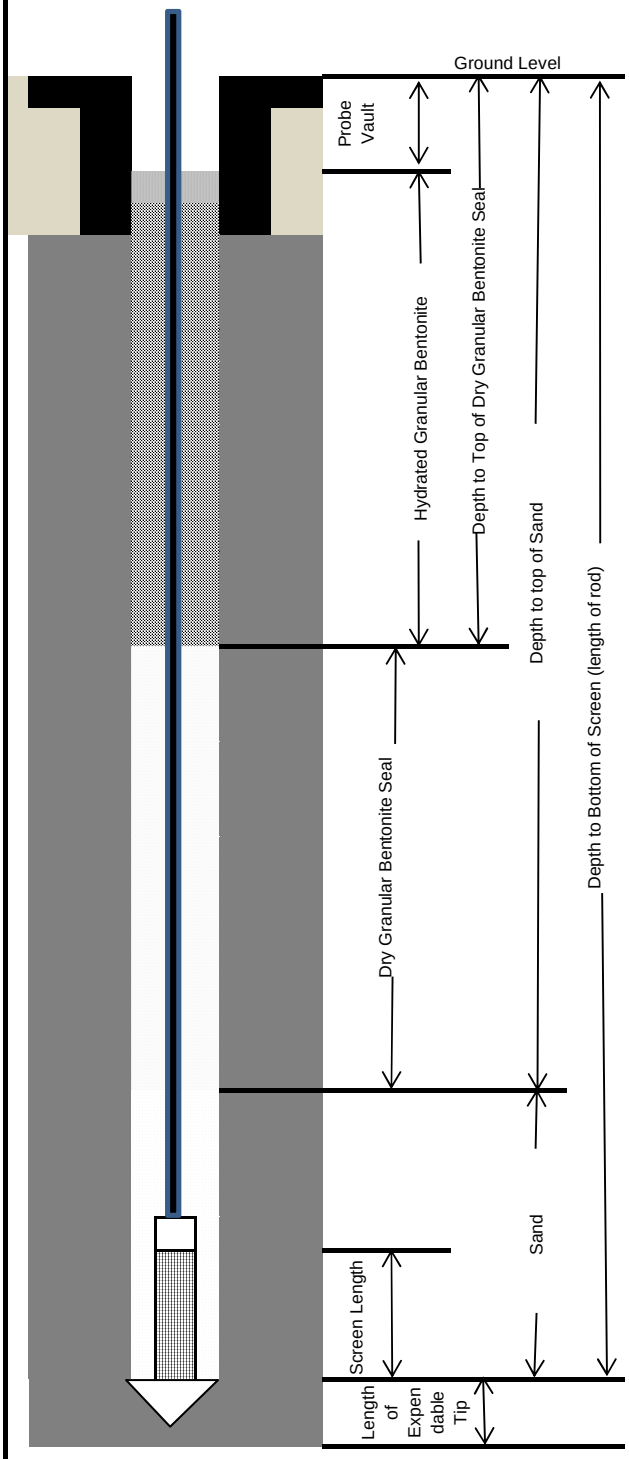
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : 2.0" O.D. Hand Auger

START : 8/11/2016 9:50 END: 8/11/2016 11:50 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.0
(1) Depth to Bottom of Screen (ft. bgs)	11.4
(2)Depth to Top of Sand (ft. bgs)	10.3
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	5.3
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	1.1
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	4.5
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	0.0

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-79
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

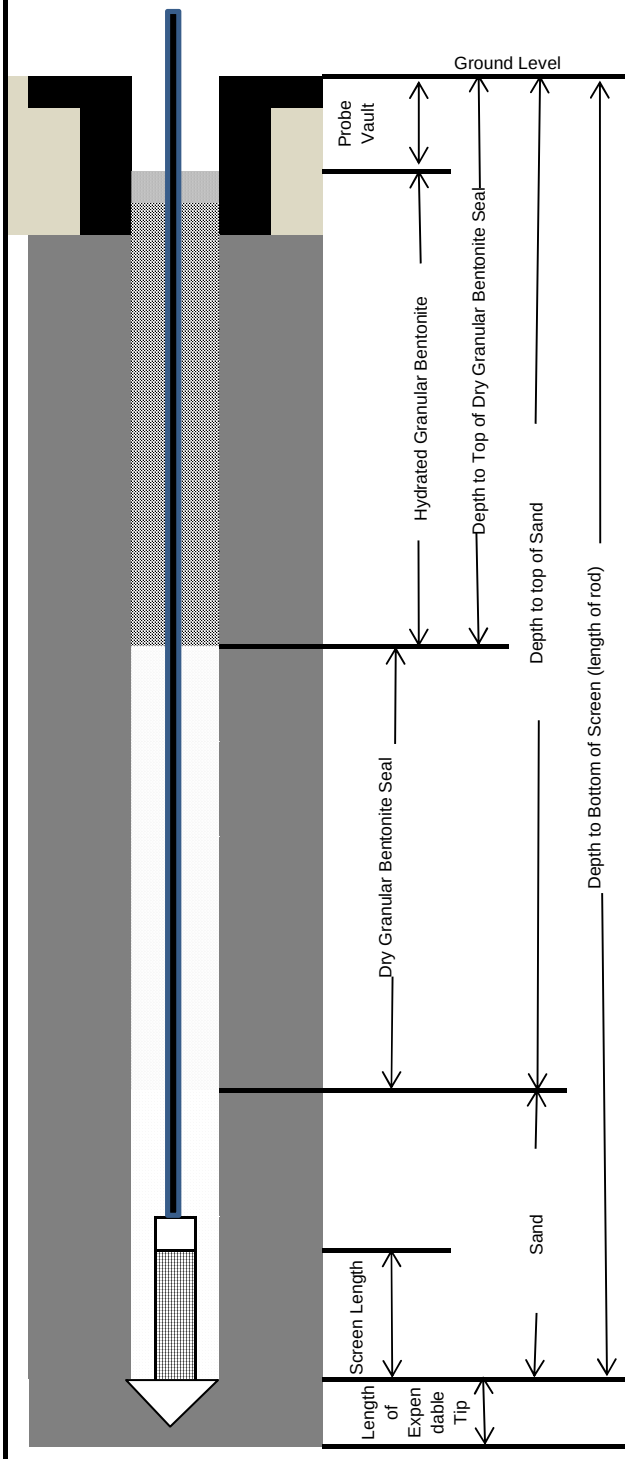
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 6610DT 2.25 inch outer diameter rods

START : 8/12/2016 9:40 END: 8/12/2016 11:45 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	13.4
(2)Depth to Top of Sand (ft. bgs)	11.3
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	6.3
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	2.1
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	5.5
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	8.4

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-80
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

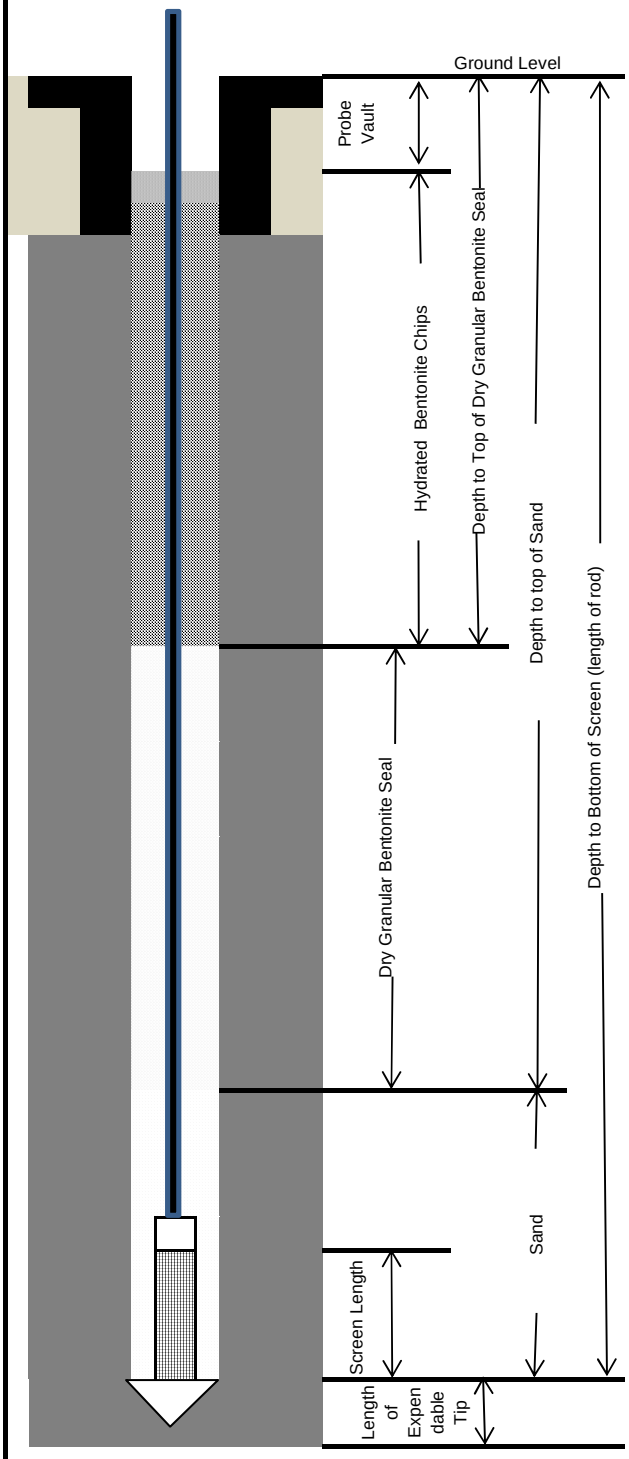
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : 2.5" O.D. Hand Auger/Geoprobe 6610DT 2.25 inch outer diameter rods

START : 8/11/2016 14:10 END: 8/12/2016 9:25 LOGGER : [redacted]



Outer Diameter of Boring (in.)	2.25
(1) Depth to Bottom of Screen (ft. bgs)	11.3
(2)Depth to Top of Sand (ft. bgs)	9.6
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	4.6
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	1.7
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Bentonite Seal (ft.)	3.8
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	8.5

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-81
678601.ET.01	SHEET 1 OF 1	DATE: 8/12/2016

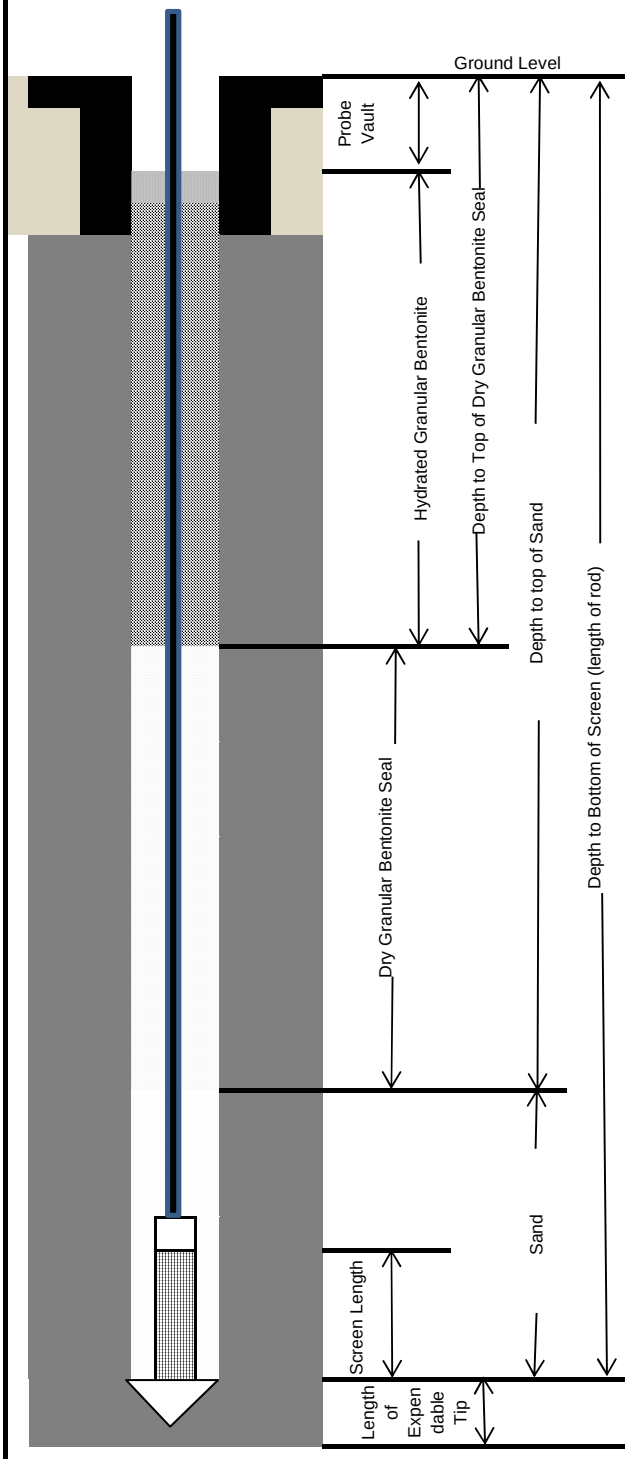
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : 3.0" O.D. Hand Auger

START : 8/12/2016 8:15 END: 8/12/2016 9:30 LOGGER : [redacted]



Outer Diameter of Boring (in.)	3.0
(1) Depth to Bottom of Screen (ft. bgs)	8.0
(2)Depth to Top of Sand (ft. bgs)	7.0
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	5.0
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	1.0
(2-3) Length of Dry Granular Bentonite Seal (ft.)	2.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	4.2
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	2.0

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

PROJECT NUMBER	PROBE NUMBER	SG-82
678601.ET.01	SHEET 1 OF 1	DATE: 8/10/2016

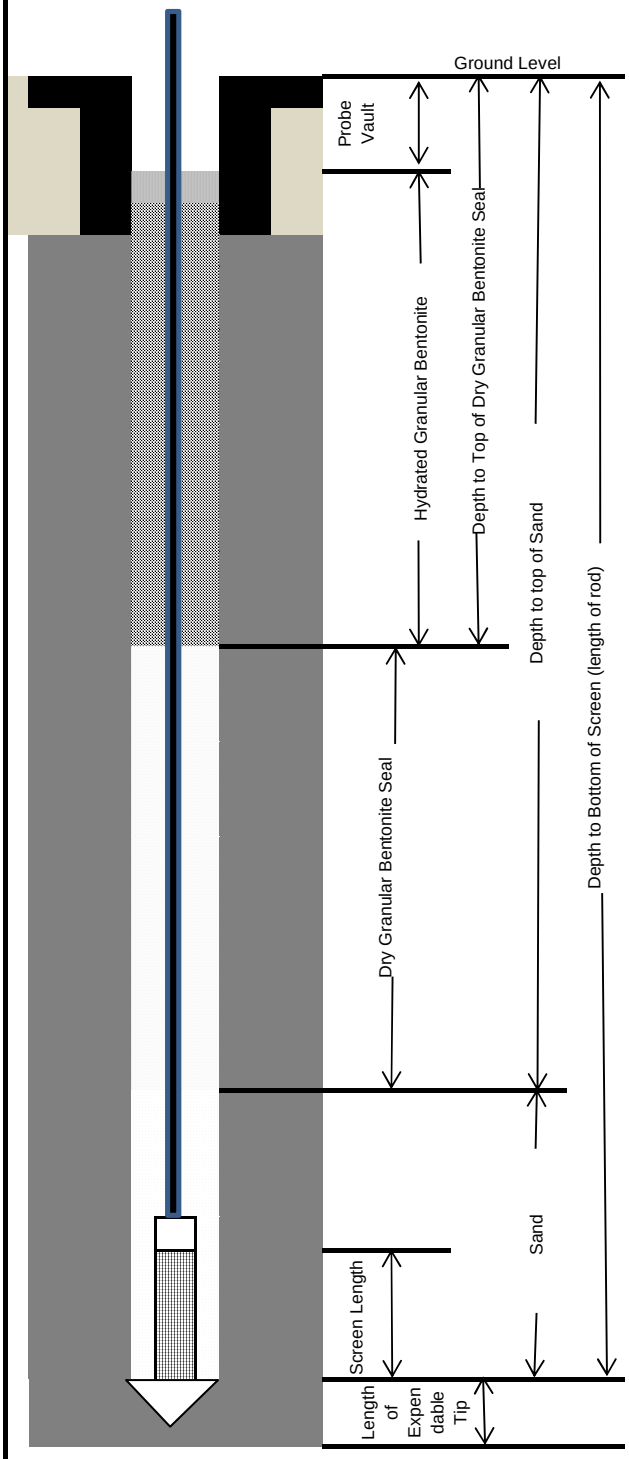
Soil Gas Probe Installation Form

PROJECT : SE Rockford Groundwater Contamination Superfund Site LOCATION : Rockford, IL

DRILLING CONTRACTOR : Terra Probe Environmental

DRILLING METHOD AND EQUIPMENT USED : 3.0" O.D. Hand Auger

START : 8/10/2016 13:55 END: 8/10/2016 16:00 LOGGER : [redacted]



Outer Diameter of Boring (in.)	3.0
(1) Depth to Bottom of Screen (ft. bgs)	13.4
(2)Depth to Top of Sand (ft. bgs)	12.4
(3)Depth to Top of Dry Granular Bentonite Seal (ft. bgs)	7.4
(4)Depth of Probe Vault (ft.)	0.8
(1-2) Length of-Sand (ft.)	1.0
(2-3) Length of Dry Granular Bentonite Seal (ft.)	5.0
(3-4) Length of Hydrated Granular Bentonite Seal (ft.)	6.6
Screen Diameter (in.) / Length (ft.)	0.5" /0.5'
Screen Mesh (in.)	0.006
Teflon Tubing Outer Diameter (in.)	0.25
Flush Mount Diameter (in.)	6.0
Length of Expendable Tip (ft.)	0.2
Soil Boring Conducted	Yes
Sand Backfill (ft. bgs)	2.0

Specifications (Quantity and Type)

Sand:	Filtration Sand
Granular Bentonite Seal:	Benseal Sodium Bentonite
Surface Completion:	Flush mount with concrete pad

Attachment 4
Soil Gas Sampling Forms

August 2016

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 8/12/16

Site

Identification: SS-74 [redacted]
Address: [redacted]
Site Information:
Describe ground cover: Bare Soil Grass
Depth to groundwater (feet below ground surface): Unknown
Describe vadose zone soil type(s): Sand / Silt Clay
Was a soil boring log completed? No
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample identification (field ID)		SER-SS-74-0816
Probe Installation	Date and time	1340 8/12/16
	Depth of hole drilled (feet below ground surface)	13.0'
	Bottom of probe screen (feet below ground surface)	12.0'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5
	Dead volume - including screen, sand pack, and tubing (mL)	0.64
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	0.1
	Purge start time	1415
	Purge vacuum (" Hg)	0 - 8.0
	Purge completion time	1418
Helium Leak Check*	Leak check (% or ppmv helium)	NA

Field Analysis (optional)	GEM2000 - O2 (%)	
	GEM2000 - CO2 (%)	
	GEM2000 - CH4 (%)	
	PID - Total VOCs (ppmv)	
Canister Sampling	Canister ID	
	Flow controller ID	
	Pressure gauge ID (optional)	
	Sampling rate or period (mL/min or hours)	
	Sample start date and time	
	Initial canister pressure (" Hg)	
	Sampling vacuum (" Hg)	
	Sample completion date and time	
	Final canister pressure (" Hg)	

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test

Weather conditions during sampling: Sunny 80s

Observations and Comments: Purge and vacuum went up to -8. stopped purge. Waited for 10 minutes. Did Not drop. Abandon sample

REV. 11/15/11

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SERockford
Project #:
Sampler Name: [redacted]
Date: 8/18/16

Site

Identification: SG-75
Address: [redacted]
Site Information:
Describe ground cover: Vegitation, Dirt Trail
Depth to groundwater (feet below ground surface): 7.5'
Describe vadose zone soil type(s): Silt
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SG-75-0816
Probe Installation	Date and time	8/12/16 1235
	Depth of hole drilled (feet below ground surface)	6.0'
	Bottom of probe screen (feet below ground surface)	6.0'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5'
	Dead volume - including screen, sand pack, and tubing (mL)	0.34 L
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200 ml/min
	Purge start time	0856
	Purge vacuum (" Hg)	0
	Purge completion time	0902
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmV Pass

Field Analysis (optional)	GEM2000 - O2 (%)	14.5
	GEM2000 - CO2 (%)	4
	GEM2000 - CH4 (%)	9
	PID - Total VOCs (ppmv)	0
Canister Sampling	Canister ID	1SC00693
	Flow controller ID	0403056
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6 min/1L
	Sample start date and time	8/18/16 0903
	Initial canister pressure (" Hg)	-29.08
	Sampling vacuum (" Hg)	[redacted] 0
	Sample completion date and time	8/19/16 0909
	Final canister pressure (" Hg)	-5.90

$H_2S = 0$

CO
LEL

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test

Weather conditions during sampling: 70° Sunny

Observations and Comments:

REV. 11/15/11

1 purge volume 0.34 L
1 purge vol. time 1.7 min

Helium start 39.6% shrouded
Helium stop - 27.8% shrouded

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project # :

Sampler Name: [redacted] Date: 8/18/16

Site

Identification: SG-76 [redacted]

Address: [redacted]

Site Information:

Describe ground cover: Bare Soil / Vegitation

Depth to groundwater (feet below ground surface): Unknown

Describe vadose zone soil type(s): Silt Sand clay

Was a soil boring log completed? No Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SER-SG-76-0816 / -D	
Probe Installation	Date and time	8/12/16 1446
	Depth of hole drilled (feet below ground surface)	15.5'
	Bottom of probe screen (feet below ground surface)	15'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5'
	Dead volume - including screen, sand pack, and tubing (mL)	0.52
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	200 ml/m
	Purge start time	0817
	Purge vacuum ("Hg)	0
	Purge completion time	0826
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmv / 0 ppmv pass

Field Analysis (optional)	GEM2000 - O2 (%)	LEL 6 / 5
LEL not cal'd	GEM2000 - CO2 (%)	O2 18.6 / 18.6
	GEM2000 - CH4 (%)	CO 14 / 7
	PID - Total VOCs (ppmv)	0 / 0
Canister Sampling	Canister ID	1SC00220 / 1SC00138
	Flow controller ID	3A01196 (sing & DC
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	8 min / single can / 10 min / 2 can
	Sample start date and time	0830 8/18/16
	Initial canister pressure ("Hg)	-28.29 / -28.23
	Sampling vacuum ("Hg)	0
	Sample completion date and time	0838 8/18/16
	Final canister pressure ("Hg)	-6.00 / -6.09

H2S = 0/0

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny 70°, calm

Observations and Comments: —

REV: 11/15/11

Helium @ start 32.9% in shroud 1 purge volume 0.52L

Helium @ end 42.6% in shroud 1 purge Volume time 2.6 minutes

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: (TBD) ET.03
Sampler Name: [redacted]
Date: 8/16/16

Structure

Identification: SG-77
Address: [redacted]
Slab Information:
Condition of slab: Grass
Describe material under the slab (gravel, sand, etc.): Clay/Sand
Is water present in the soil? Soil Types
Boring Log completed VES Diagram types
Depth to Water 21.91'

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SER-SG-77-0816	
Probe Installation	Date and time 1220 1530	8/10/16
	~~Thickness of slab (inches)~~ Depth at Hole	16.6'
	~~Depth of hole drilled (inches below slab surface)~~ Bottom of Probe	16.4
	~~Total VOCs measure in hole with PID (ppmv)~~ Length of Probe / Width	6" / 0.5'
	Depth of installed probe (inches below slab surface) Volume	0.49
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass / pass
Probe Purge	Purge rate (mL/min)	0.2 L/m
	Purge start time	1437
	Purge vacuum (" Hg)	0
	Purge completion time	1445
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	17.8 / 17.8
MultiRAE PID	CO (ppm)	13 / 0
	H2S (ppm)	0 / 0
	LEL (%)	0 / 4
	Total VOCs (ppm)	0.4 / 0.4
Canister Sampling	Canister ID Bad Can ~~1SC00880~~ 1SC00225	
	Flow controller ID Bad Can ~~DA2065~~ DA01874	
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	1C/9 minutes
	Sample start date and time	1501
	Initial canister pressure (" Hg)	~~28.71~~ -28.77
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1510
	Final canister pressure (" Hg)	-1.66

Weather conditions during sampling: Hot Humid Sunny 85

Observations and Comments: Purge Volume 0.49L time Purge Volume 2.5 minute

Helium in shroud start 36.69a
End 24.19
0 ppm helium in purge gas.

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 478601.ET.01
Sampler Name: [redacted]
Date: 8/16/16

Structure

Identification: SSG-78
Address: [redacted]
Slab Information:
Condition of slab: Ground cover: Grass/Landscaping Depth to GW: Unknown
Describe material under the slab (gravel, sand, etc.): Clay Sand
Is water ~~present in the soil~~? Boring Log Completed

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SSR-SSG-78-0816	
Probe Installation	Date and time	8/11/16 1150
	Thickness of slab (inches)	Depth of Hole 11.6 Bottom of Probe 11.6
	Depth of hole drilled (inches below slab surface)	Length: 6 inches Probe screen Vertical 5 feet
	Total VOCs measure in hole with PID (ppmv)	Volume 6.38
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	0.2 LPM
	Purge start time	1543 8/16/16
	Purge vacuum (" Hg)	0
	Purge completion time	1548
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	6.5
MultiRAE PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	10
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	ISC 0769
	Flow controller ID	MFC 02094
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	1L/7 minutes
	Sample start date and time	1550 8/16/16
	Initial canister pressure (" Hg)	-28.74
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1557 8/16/16
	Final canister pressure (" Hg)	-2.73

Weather conditions during sampling: Sunny 85° Humid

Observations and Comments:

1 Purge Volume 0.38 L
1 Purge Volume Time 1.9 min
3 ppmV Helium in Purge gas

Helium at start = 40.1%
Stop = 29.2%

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601.ET.01

Sampler Name: [redacted] Date: 8/16/16

Structure

Identification: SER-SG-79-0816

Address: [redacted]

Slab Information:

~~Condition of slab~~ Concrete; Grassy, Depth to GW: 21' Soil Types Silt/Sand

~~Describe material under the slab (gravel, sand, etc.)~~

Is water present in the soil? Boring Log completed

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SER-SG-79-0816	
Probe Installation	Date and time	8/12/16 1145
	~~Thickness of slab (inches)~~ Depth of Hole: 13.6 Bottom of Screen 12.4	
	Depth of hole drilled (inches below slab surface) Length of screen 6"	
	Total VOCs measure in hole with PID (ppmv) Width of Screen 0.5 feet	
	Depth of installed probe (inches below slab surface) Probe Vol: 0.69	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	0.2 L/m
	Purge start time	1629
	Purge vacuum (" Hg)	~~-30~~ -8
	Purge completion time	1631
Water Dam Leak Check*	Leak check (pass or fail?)	NA

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	
MultiRAE PID	CO (ppm)	
	H2S (ppm)	
	LEL (%)	
	Total VOCs (ppm)	
Canister Sampling	Canister ID	
	Flow controller ID	
	Pressure gauge ID (optional)	
	Sampling rate or period (mL/min or hours)	
	Sample start date and time	
	Initial canister pressure (" Hg)	-28.79
	Sampling vacuum (" Hg)	
	Sample completion date and time	
	Final canister pressure (" Hg)	

Weather conditions during sampling: Sunny 80

Observations and Comments: Purge vacuum wasn't -10 during purge. Probe has 2 feet ft of sand. No water going into ~~SG~~

Helium Inshoot = 28.39 to start

1631 - Vacuum @ -10 - Stop purg allow probe to recover

1645 - Still @ -10 vacuum - Not able to sample

ch2m:

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SF - Rockford
Project # 678601 ET.01
Sampler Name: [redacted]
Date: 8/17/16

Site

Identification: SG-80
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): 13.6'
Describe vadose zone soil type(s): Sand/Clay
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample identification (field ID)	SFR-SG-80-0816-D	
Probe Installation	Date and time	8/12/16 0850
	Depth of hole drilled (feet below ground surface)	11.5'
	Bottom of probe screen (feet below ground surface)	11.5'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5"
	Dead volume - including screen, sand pack, and tubing (mL)	0.58
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	0.2 L/min
	Purge start time	1000
	Purge vacuum ("Hg)	-8
	Purge completion time	1002
Helium Leak Check*	Leak check (% or ppmv helium)	700,000 ppmv fail

Field Analysis (optional)	~~GEM2000 - O2 (%)~~	99-LEL
	~~GEM2000 - CO2 (%)~~	499 CO
	~~GEM2000 - CH4 (%)~~	16.9 pid
	~~PID - Total VOCs (ppmv)~~	H2S= 0
Canister Sampling	Canister ID	
	Flow controller ID	
	Pressure gauge ID (optional)	
	Sampling rate or period (mL/min or hours)	
	Sample start date and time	N/A
	Initial canister pressure ("Hg)	
	Sampling vacuum ("Hg)	
	Sample completion date and time	
	Final canister pressure ("Hg)	

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny 80s

Observations and Comments: Started purge and vacuum went up to -8. Stopped purge gas vacuum dropped -3 inches in 15 minutes. Purged again at lower flow, also vacuum went up to -8. Sample purge gas had 700,000 ppm between and PID=16.9, CO=499, 99 LEL
42' Abandon @ 1045

ch2m:

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 8/18/16

Site

Identification: SER-SG-80-0816
Address: [redacted]
Site Information:
Describe ground cover: ~~Bottom~~ Grass
Depth to groundwater (feet below ground surface): ~~6.5~~ 13.6'
Describe vadose zone soil type(s): Sand/Clay
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SG-80
Probe Installation	Date and time	8/12/16 0850
	Depth of hole drilled (feet below ground surface)	11.5'
	Bottom of probe screen (feet below ground surface)	11.5'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5'
	Dead volume - including screen, sand pack, and tubing (mL)	0.5L
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	50ml/min
	Purge start time	1356
	Purge vacuum (" Hg)	-8
	Purge completion time	1547
Helium Leak Check*	Leak check (% or ppmv helium)	30.3%

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis (optional)	GEM2000 - O2 (%)	18.1
	GEM2000 - CO2 (%)	0.9%
	GEM2000 - CH4 (%)	0.1%
	PID - Total VOCs (ppmv)	NA
Canister Sampling	Canister ID	1550208
	Flow controller ID	OA01631
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~5ml/L~~ 1 hr 23mm
	Sample start date and time	8/18/16 1555
	Initial canister pressure (" Hg)	-28.55
	Sampling vacuum (" Hg)	-8
	Sample completion date and time	8/18/16 1718
	Final canister pressure (" Hg)	-5.35

LEL 3%

Weather conditions during sampling: Sunny 94°F

Observations and Comments: See back page for Purge/Sample Log. Valves open until vacuum gets to -8. Valves closed until probe recovers

1358 Vac @-8
stop pump
close valve to pump

1408 Vac @-2
turn on He
start pump
open valve to pump

flow about 50 ml/min

1410 vac @-8
stop pump
close valve
turn off He (21.0%)

1420 vac @-2
turn on He
start pump
open valve to pump

1422 vac @ -8
stop pump
close valve
turn off He (22.7%)

1435 vac @-2
turn on He
start pump
open valve

1436 vac @-8
turn off He (30.2)
stop pump
Close valve

1453 vac @-2
turn on He
start pump
Open valve

1454 vac @-8
He (26.8)

1509 vac @-2
turn on He
open valve
start pump

1511 vac @-8 (0.5 L)
He (34.8%)

1527 vac @-2
turn on He
open valve
start pump

1528 vac @ -8 (0.55 L)
He (38.0%)
He @ 2500 ppm in purge air

1546 vac @ -2

1547 vac @ -8
He (30.3%)

1555 open valve
He on

1556 close valve
He off (31.4%)

1611 open valve (-22)
He on

1612 close valve (-18)
He off (29.3%)

1628 He on
open valve (-18)

1629 close valve (-1
He off (24.1%)

1645 open valve (-13
He on

1646 close valve (-10
He off (21.0%

1701 open valve (-10
He on

1702 close valve (-7
He off (31.5%

1717 open valve (-6)
He on

1718 close valve (-5
He off (22.2%

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 8/18/16

Site

Identification: SG-81
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): 9.5'
Describe vadose zone soil type(s): Clay/Sand
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SG-81-0811
Probe Installation	Date and time	8/11/16 0930
	Depth of hole drilled (feet below ground surface)	10.2'
	Bottom of probe screen (feet below ground surface)	8'
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5'
	Dead volume - including screen, sand pack, and tubing (mL)	1.46L
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	200 ml/min
	Purge start time	1029
	Purge vacuum (" Hg)	~~200~~ 0
	Purge completion time	1055
Helium Leak Check*	Leak check (% or ppmv helium)	0/0/0/0 ppmV Pass

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis (optional)	GEM2000 - O2 (%)	16.9/16.9/16.9/17.0/17.0
	GEM2000 - CO2 (%)	0/0/0/0/0
LEL not calibrated	GEM2000 - CH4 (%)	7/7/8/9/9 ppm
	PID - Total VOCs (ppmv)	0/0/0/0/0 ppm
Canister Sampling	Canister ID	1500215
	Flow controller ID	0A00800
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6 min/1L
	Sample start date and time	1056 8/11/16
	Initial canister pressure (" Hg)	-28.95
	Sampling vacuum (" Hg)	0
	Sample completion date and time	8/18/16 1102
	Final canister pressure (" Hg)	-3.31

Weather conditions during sampling: Sunny 75°

Observations and Comments:

REV. 11/15/11

Start helium 29.3% in shroud End Helium 31.1% in shroud
1 purge volume 1.46 3 purge volumes 4.38 L
1 purge volume time 7.3 minutes 3 volumes 21.9 minutes

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 8/16/16

Site

Identification: SG-82
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): Clay
Was a soil boring log completed? Yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log H2S 0/0/0/0 ppm

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SG-82-0816
Probe Installation	Date and time	8/10/16 1600
	Depth of hole drilled (feet below ground surface)	15.7'
	Bottom of probe screen (feet below ground surface)	13.4
	Length of probe screen (inches)	6"
	Width of probe screen (inches)	0.5'
	Dead volume - including screen, sand pack, and tubing (mL)	1.53
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200ml/min
	Purge start time	1122
	Purge vacuum (" Hg)	0
	Purge completion time	1154
Helium Leak Check*	Leak check (% or ppmv helium)	0/0/0/0/0

Field Analysis (optional)	GEM2000 - O2 (%)	18.5/18.6/18.6/18.5/18.5%
	GEM2000 - CO2 (%)	11/0/0/0/0 ppm
	GEM2000 - CH4 (%) LEL	8/8/8/9/9 %
	PID - Total VOCs (ppmv)	2.6/2.4/2.3/2.5/2.3 ppm
Canister Sampling	Canister ID	1550322L
	Flow controller ID	0A00651
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6min/1L
	Sample start date and time	1157 8/18/16
	Initial canister pressure (" Hg)	-28.73
	Sampling vacuum (" Hg)	0
	Sample completion date and time	8/18/16 1203
	Final canister pressure (" Hg)	1203 @ -2.70

use volume of purge gas to determine when to stop

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test

Weather conditions during sampling: Cloudy 80

Observations and Comments:

REV. 11/15/11

Helium in shroud at start 37.9% Check Helium in shroud after every bag is changed all above 20%

1 Purge volume 1.53L 1 volume purge time @ 7.7 min 3 purge volume 23.1 minutes

3 Purge vol 4.59L

December 2016

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Redford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 12/01/16

Site

Identification: SG-75
Address: [redacted]
Site Information:
Describe ground cover: Soil | Trees | plants
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): NA
Was a soil boring log completed? See previous
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SG-75 (SER-SG-76-1216)
Probe Installation	Date and time	
	Depth of hole drilled (feet below ground surface)	See
	Length of probe screen (inches)	Previous
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	OK-S
Probe Purge	Helium Conc. In Shroud (%)	21.0
	Purge rate (mL/min)	200
	Purge start time	0854
	Purge vacuum (" Hg)	0
	Purge completion time	0901
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmv
	Pass or Fail?	Pass

* The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis MultiRae PID	O2 (%)	18.7
	CO (ppm)	0
	H2S (ppm)	0
	~~LEL (%)~~ CH4	0% LEL=1%
	Total VOCs (ppmv)	0
Tedlar Bag Sampling (1 Liter)	Sample start date and time	
	Sampling rate or period (mL/min)	NA
	Sample completion date and time	
Canister Sampling	Canister ID	ISC01102
	Flow controller ID	OA00815
	Sampling rate or period (mL/min)	1L/6 minutes
	Sample start date and time	0902 12/1/16
	Initial canister pressure (" Hg)	-28.73
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	0908
	Final canister pressure (" Hg)	-5.23

Weather conditions during sampling: Cloudy 35°

Observations and Comments: None

REV. 5/10/16

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Pra ces
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info			
Project Name:	SE Rockford	Project # :	678,601,ET,01
Sampler Name:	[redacted]	Date:	12/1/16

Site	
Identification:	SG-76
Address:	[redacted]
Site Information:	
Describe ground cover	Grass
Depth to groundwater (feet below ground surface)	NA
Describe vadose zone soil type(s)	See previous
Was a soil boring log completed?	NA
Was a probe diagram completed?	Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SG-76-1216
Probe Installation	Date and time	
	Depth of hole drilled (feet below ground surface)	See
	Length of probe screen (inches)	Previous
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Helium Conc. in Shroud (%)	22.3%
	Purge rate (mL/min)	200
	Purge start time	0813
	Purge vacuum (" Hg)	0
	Purge completion time	0821
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmV
	Pass or Fail?	Pass

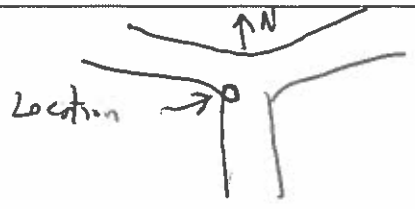
Field Analysis MultiRae PID	O2 (%)	18.8
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%) CH4	0 with GEM
	Total VOCs (ppmv)	0.1
Tedlar Bag Sampling (1 Liter)	Sample start date and time	~~827~~ qr.
	Sampling rate or period (mL/min)	NA
	Sample completion date and time	NA
Canister Sampling	Canister ID	15C01253
	Flow controller ID	0A02110
	Sampling rate or period (mL/min)	1L/6min
	Sample start date and time	0827 12/1/16
	Initial canister pressure (" Hg)	-28.61
	Sampling vacuum (" Hg)	N/A
	Sample completion date and time	0833
	Final canister pressure (" Hg)	-2.25

* The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Cloudy 35°

Observations and Comments: Location is on the west side of trail where the road splits. MA covered with run off sediment.

REV. 5/10/16



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Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SF Rockaway
Project #: 678601 (E180)
Sampler Name: [redacted]
Date: 12/1/16

Site

Identification: SG-77
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): NA
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SG-77/SER-SIG-76-124
Probe Installation	Date and time	
	Depth of hole drilled (feet below ground surface)	
	Length of probe screen (inches)	See Revised
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Helium Conc. In Shroud (%)	24.1
	Purge rate (mL/min)	200
	Purge start time	0957
	Purge vacuum (" Hg)	0
	Purge completion time	1007
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmV
	Pass or Fail?	Pass

*The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis MultiRae PID	O2 (%)	16.2	
	CO (ppm)	0	
	H2S (ppm)	0	
	LEL (%) CH4	0 with GEM	
	Total VOCs (ppmv)	0.1	
Tedlar Bag Sampling (1 Liter)	Sample start date and time		
	Sampling rate or period (mL/min)	NA	
	Sample completion date and time		
Canister Sampling	Canister ID	1SC [illegible]	1SC [illegible]
	Flow controller ID	[illegible]	CA01319
	Sampling rate or period (mL/min)	145 mL/min	1L/5 min
	Sample start date and time	12/1/16 1008	12/1/16 1008
	Initial canister pressure (" Hg)	-25.66	-25.66
	Sampling vacuum (" Hg)	NA	NA
	Sample completion date and time	12/1/16 1013	12/1/16 1013
	Final canister pressure (" Hg)	-7.81	-6.80

Weather conditions during sampling: Cloudy 35°

Observations and Comments: Purge volume 3x = 1.5L

REV. 5/10/16

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SERockt.rd
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 12/1/16

Site

Identification: SS-78
Address: [redacted]
Site Information:
Describe ground cover: grass
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): NA
Was a soil boring log completed? yes
Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SS-78-1216
Probe Installation	Date and time	See previous
	Depth of hole drilled (feet below ground surface)	
	Length of probe screen (inches)	
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Noss
Probe Purge	Helium Conc. In Shroud (%)	29.7%
	Purge rate (mL/min)	200
	Purge start time	1034
	Purge vacuum (" Hg)	0
	Purge completion time	1041
Helium Leak Check*	Leak check (% or ppmv helium)	0 ppmV
	Pass or Fail?	Pass

Field Analysis MultiRae PID	O2 (%)	2.6
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	1.0
	Total VOCs (ppmv)	0.1
Tedlar Bag Sampling (1 Liter)	Sample start date and time	
	Sampling rate or period (mL/min)	
	Sample completion date and time	
Canister Sampling	Canister ID	ISC01210
	Flow controller ID	0A01112
	Sampling rate or period (mL/min)	1L/6 min
	Sample start date and time	1042 12/1/16
	Initial canister pressure (" Hg)	-28.38
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1048 12/1/16
	Final canister pressure (" Hg)	-6.77

*The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Cloudy 35°

Observations and Comments: 18.1% CO_2 1% LEL no measurable MeOH ~~O2 value confirmed by GEM/MultiRae~~

REV. 5/10/16

ch2m:

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601 ET01
Sampler Name: [redacted] Date:

Site

Identification: SG-80
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): NA
Was a soil boring log completed? ~~yes~~ Was a probe diagram completed? yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SG-80-1211
Probe Installation	Date and time	See Prevay
	Depth of hole drilled (feet below ground surface)	
	Length of probe screen (inches)	
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Helium Conc. In Shroud (%)	27.2%
	Purge rate (mL/min)	200
	Purge start time	1330
	Purge vacuum ("Hg)	0 to -8
	Purge completion time	1420
Helium Leak Check*	Leak check (% or ppmv helium)	0/0 ppmv
	Pass or Fail?	Pass

* The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis MultiRae PID	O2 (%)	16.6	18.5
	CO (ppm)	0	0
	H2S (ppm)	0	0
	LEL (%) GEM	0	17% GCM
	Total VOCs (ppmv)	0.1	0.1
Tedlar Bag Sampling (1 Liter)	Sample start date and time	-	
	Sampling rate or period (mL/min)		
	Sample completion date and time		
Canister Sampling	Canister ID	1SC 00959	
	Flow controller ID	OA01764	
	Sampling rate or period (mL/min)	1L/~~5min~~	28mn
	Sample start date and time	12/1/16 1428	
	Initial canister pressure ("Hg)	-28.66	
	Sampling vacuum ("Hg)	0 to -8	
	Sample completion date and time	1456	
	Final canister pressure ("Hg)	-6.75	

Weather conditions during sampling: Cloudy drizzle

Observations and Comments: Probe was purged of 3 volumes by purging probe with pump until vacuum was @ approx -8. Pump was stopped and probe was allowed to recharge back down to zero. The pump was then turned on and the probe was purged again to -8. The process was repeated until 3 probe volumes was removed (@ 1.74 Liter) After 1L of purge gas was removed, a second empty bag was placed on probe outlet. Purge was Completed at 3 probe volume was purged. The helium was started 5 minute prior to start of purging. Helium conc. in shroud was checked to confirm it was above 20%.

Purge Log for S6-80

		(Vacuum)
13:30	Start Purge	(0)
1332	Stop Purge	(-8)
1337	Start Purge	(0)
1339	Stop Purge	(-8)
1344	Start Purge	(0)
1346	Stop Purge	(-8)
~~1300~~ 1350	Start Purge	(0)
1353	Stop Purge	(-8)
1358	Start Purge	(0)
1400	Stop Purge	(-8) → 1L Purged change Tedlar bag. No helium detected in purge gas
1405	Start Purge	(0)
1407	Stop Purge	(-8)
1413	Start Purge	(0)
1415	Stop Purge	(-8)
1420	Start Purge	(0)
1422	Stop Purge	(-8) → 0.74 Liter Purged. Stop purge. No helium in Tedlar bag

Ok to sample. Probe not leaking, therefore helium not required during sampling

1428 - Start sample. Canister Valve opened and canister allowed to fill until vacuum gauge was @ -8. Valves closed and probe allowed to recharge. Canister need @4 cycles to fill

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info	
Project Name:	SE Rockford
Project #:	678601.ET.01
Sampler Name:	[redacted]
Date:	12/1/16

Site	
Identification:	SE-81
Address:	[redacted]
Site Information:	
Describe ground cover	grass
Depth to groundwater (feet below ground surface)	NA
Describe vadose zone soil type(s)	NA
Was a soil boring log completed?	yes
Was a probe diagram completed?	yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SE-81-1216
Probe Installation	Date and time	
	Depth of hole drilled (feet below ground surface)	Soil Probe Issues
	Length of probe screen (inches)	
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Helium Conc. In Shroud (%)	31.2%
	Purge rate (mL/min)	200
	Purge start time	1124
	Purge vacuum (" Hg)	0
	Purge completion time	1155
Helium Leak Check*	Leak check (% or ppmv helium)	0.0 0.0 0.0 22ppmv
	Pass or Fail?	Pass

*The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis MultiRae PID	O2 (%)	20.1	18.6	18.2	18.7	18.7
	CO (ppm)	0	0	0	0	0
	H2S (ppm)	0	0	0	0	0
	LEL (%) with Gem	0	0	0	0	0
	Total VOCs (ppmv)	0.1	0.1	0	0	0
Tedlar Bag Sampling (1 Liter)	Sample start date and time					
	Sampling rate or period (mL/min)					
	Sample completion date and time					
Canister Sampling	Canister ID	1SC01275				
	Flow controller ID	OA01671				
	Sampling rate or period (mL/min)	1L/4 4min				
	Sample start date and time	1156 12/1/16				
	Initial canister pressure (" Hg)	-28.69				
	Sampling vacuum (" Hg)	NA				
	Sample completion date and time	1200 12/1/16				
	Final canister pressure (" Hg)	-5.20				

Weather conditions during sampling: Cloudy 35°

Observations and Comments: 3x purge Volume = 4.5 liters. No helium detected in any of the Tedlar Bags checked

REV. 5/10/16

Probe purged into 1L bag. after one was filled, a second empty bag was placed on pump outlet. Each bag was screened with helium detector / MultiRae + Gem

ch2m:

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Vapor Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601 E1.01
Sampler Name: [redacted]
Date: 12/1/16

Site

Identification: SG-82
Address: [redacted]
Site Information:
Describe ground cover: Grass
Depth to groundwater (feet below ground surface): NA
Describe vadose zone soil type(s): NA
Was a soil boring log completed? Yes
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SFR-SG-82-1216
Probe Installation	Date and time	
	Depth of hole drilled (feet below ground surface)	5ft
	Length of probe screen (inches)	6 inches
	Width of probe screen (inches)	
	Dead volume - including screen, sand pack, and tubing (mL)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Helium Conc. In Shroud (%)	26.5%
	Purge rate (mL/min)	200
	Purge start time	1220
	Purge vacuum (" Hg)	0
	Purge completion time	1257
Helium Leak Check*	Leak check (% or ppmv helium)	0/0/0/0 ppmv
	Pass or Fail?	Pass

* The soil vapor probe passes the helium leak check if the measured helium concentration in the purged soil gas is less than 5% of the measured helium concentration in the shroud. Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis MultiRae PID	O2 (%)	17.4	17.3	17.3	17.4	17.4	
	CO (ppm)	0	0	0	0	0	
	H2S (ppm)	0	0	0	0	0	
	LEL (%)	0	0	0	0	0	
	Total VOCs (ppmv)	0	0	0	0	0	
Tedlar Bag Sampling (1 Liter)	Sample start date and time						
	Sampling rate or period (mL/min)						
	Sample completion date and time						
Canister Sampling	Canister ID	1SC00123					
	Flow controller ID	0A01212					
	Sampling rate or period (mL/min)	14	5 minutes				
	Sample start date and time	1257 12/1/16					
	Initial canister pressure (" Hg)	-28.65					
	Sampling vacuum (" Hg)	NA					
	Sample completion date and time	12/1/16 @ 1302					
	Final canister pressure (" Hg)	-6.81" Hg					

Weather conditions during sampling: Cloudy 40

Observations and Comments: 1.53L x 3 = 4.59L Purge Volume
Probe purged into a 1L Bag. After one was filled, a second empty bag was placed on pump outlet. Each Bag was screened with Helium detector/MultiRae/GEM

REV. 5/10/16

Attachment 5
Building Survey Forms

August 2016

ch2m: SM

Building Survey - Indoor Air Sampling

Project Information

Project Name: SE Rockford
Project #: 678601. FT-01
Survey Completed By: [redacted]
Date: 8/9/16
Building Address: [redacted]
Residence ID: NA

Resident and Contact Information

Name of Occupant: [redacted]
Owner / Tenant / Other: [redacted]
Occupant Phone #s: Home: [redacted] Work: [redacted] Cell [redacted]
Duration at Current Residence: [redacted]
Best Time To Call / Visit: [redacted]
Number of Building Occupants: Children (list ages): [redacted] Adults: [redacted]
(If Rental) Property Owner Name: [redacted] *Owner Phone #s:* *Home:* [redacted]
Owner Address: [redacted] *Work:* [redacted]
Name of Interviewee for Building Survey: [redacted]
Notes:

Building Construction Characteristics

Building Type: (Check box for all that apply) Single family Residence Second floor Separate Apt. [redacted]

- [X] Single Family Residential
- [ ] Multi Family Residential
- [ ] Commercial
- [ ] Ranch
- [X] Two-story
- [ ] Other (specify):
- [ ] Split Level
- [ ] Tri Level
- [ ] Duplex (# of other half of duplex):
- [X] Apartment (# of units in Building): [redacted]

Describe Building: (General Description, Construction Materials, etc.) Aluminum Siding

Approximate Age: Unk years **Approximate Area:** Total Living Space: ~~1900~~ 1900 sq.ft. First Floor: ~~1000~~ 1000 sq.ft.

Floors: # Floors at or above grade: 2

Which floors of the residence are utilized as living space / occupied? 1st + Second - Second floor separate Residence

Foundation Type:

Crawl Space: (Yes) / No
Slab on Grade: Yes / (No)
Basement: (Yes) / No

Foundation Description: (Split Foundation or Multiple Types) Unknown

Slab & Crawl Space Construction: Concrete

Basement or Crawl Space Details: (if applicable)

Finished Basement: Yes / (No) Basement Finished When: NA Approximate Area: 900 sq.ft.

Basement or Crawl Space Floor: (Check box for all that apply)

- [X] Concrete
- [X] Dirt
- [ ] Floating (built on top of actual floor)
- [ ] Other (specify):

Foundation Walls: (Check box for all that apply)

- [X] Poured Concrete
- [ ] Block
- [ ] Stone
- [ ] Other (specify):

Does the basement or crawl space have a moisture problem - dampness? (Check only one)

- [X] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [ ] No

Is the basement or crawl space ever wet - flooded? (Check only one)

- [X] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [ ] No

Building Address: [redacted] Date: 8/9/16

Basement or Crawl Space Details Continued: (if applicable)

Does the basement have any of the following? (Check all that apply)

- [X] Floor cracks
- [ ] Wall cracks
- [X] Floor Drain
- [ ] Sump pump
- [ ] Other hole / opening in floor (describe): Filled with water

Is the sump pump used? Yes / No NA Depth of sump? ____ ft Where does the sump pump drain? ____

Describe ventilation of crawl space: Windows

Description of ground cover outside of building: [X] Grass [ ] Concrete [ ] Asphalt [ ] Other: Grass

Heating & Ventilation Systems

Heating System - Fuel Type: (Check box for all that apply)

- [X] Natural Gas
- [ ] Electric
- [ ] Coal
- [ ] Fuel Oil
- [ ] Wood
- [ ] Other (specify):

Heating - Conveyance System: (Check box for all that apply)

- [X] Forced Hot Air
- [ ] Electric Baseboard
- [ ] Wood Stove
- [ ] Fireplace
- [ ] Forced Hot Water
- [ ] Hot Water Radiation
- [ ] Heat Pump
- [ ] Kerosene Heater
- [ ] Other (specify):

Type of Ventilation System: (Check box for all that apply)

- [X] Central air handler / blower
- [ ] Mechanical / ceiling fans
- [ ] Bathroom ventilation fans
- [ ] Air-to-air heat exchanger
- [ ] Kitchen range hood fan
- [ ] Other (specify):

Does the Residence have Air Conditioning: (Check box for all that apply)

- [ ] Central Air Conditioning
- [ ] Window Air Conditioners
- [ ] Other (specify): No Air Conditioning.

Describe the current operating conditions of the HVAC system: Window fans

Miscellaneous Information

Does the Residence have any of the following?

Septic System? Yes / Yes (but not used) / (No) Irrigation / Private Well? No

Existing subsurface depressurization (radon) system in place? Yes / (No) Is it running? Yes / No NA

Is there standing water outside the residence (pond, ditch, swale)? Yes / (No) If so, describe: ____

Has the residence been retrofitted / weatherized with any of the following? (Check box for all that apply)

- [X] Insulation
- [ ] Storm Windows
- [ ] Energy-efficient windows
- [ ] Other (specify): Insulation in Attic

Does the building have an attached garage? Yes / (No) If so, is a car usually parked in the garage? Yes / No NA

Chemicals

Have any pesticides / herbicides been applied around the building foundation or in the yard / gardens? Yes / (No) Rodenticide in yard but be gone

If so, when - and which chemicals? ____

Has the residence had a pesticide treatment inside? Yes / (No) When / by whom? ____

Do the occupants of the building have their clothes dry-cleaned? Yes / (No)

When were dry-cleaned clothes last brought into the building? ____

Have the occupants ever noticed any unusual odors in the building? Yes / (No)

Describe (with location): ____

Building Address: _____ Date: _____

Miscellaneous Information Continued:

Have there been any known spills of a chemical immediately outside or inside the building? Yes / (No)

Describe (with location): _____

Do any of the occupants smoke inside the building? (Yes) / No How often? All day

Do any of the occupants use solvents at work? (Yes) / No Are their clothes washed at home? (Yes) / No

If so, when - and what rooms? Airplane Mechanic

Within the last 6 months, has there been any painting or remodeling in the residence? Yes / (No) If so, when _____

What rooms, and what specifically was done? 2 years / New floor

Within the last 6 months, has any new carpeting been installed? Yes / (No) Have the carpets or rugs been cleaned? NA Yes / No

If so, when, what rooms, and what cleaners? No

Consumer Products Inventory

Check consumer products that are present in the residence.

		Storage Location	Frequency of Usage	Date of Last Use
[X]	Paint or Wood Finishes (spray or can)	Basement 1st Floor	No Recent	No PID Readings
[X]	Paint stripper / remover / thinner	Possible in Storage room can not be Removed		
[ ]	Solvent cleaners (e.g.. spray-on oven cleaner)	No		
[ ]	Metal degreaser / cleaner	No		
[ ]	Gasoline / diesel fuel	No		
[ ]	Glues or adhesives (super glue, etc.)	No		
[X]	Air fresheners & scented candles	Yes First Floor		
[X]	Laundry / carpet spot removers	Yes First floor		
[ ]	Pesticides / Insecticides	No		
[X]	Nail polish remover (acetone)	First Floor		
[X]	Aerosols (deodorizers, polish, cleaners)	First floor		
[ ]	Other: None			
[ ]	Other: ~~h~~			
[ ]	Other: ~~h~~			

Describe any products that are containerized during sampling event:

No elevated PID Readings around Household chemicals Now Removed

Provide any additional information that is provided by interviewee:

13 gallons Latex Paint in basement No PID Readings Not Removed

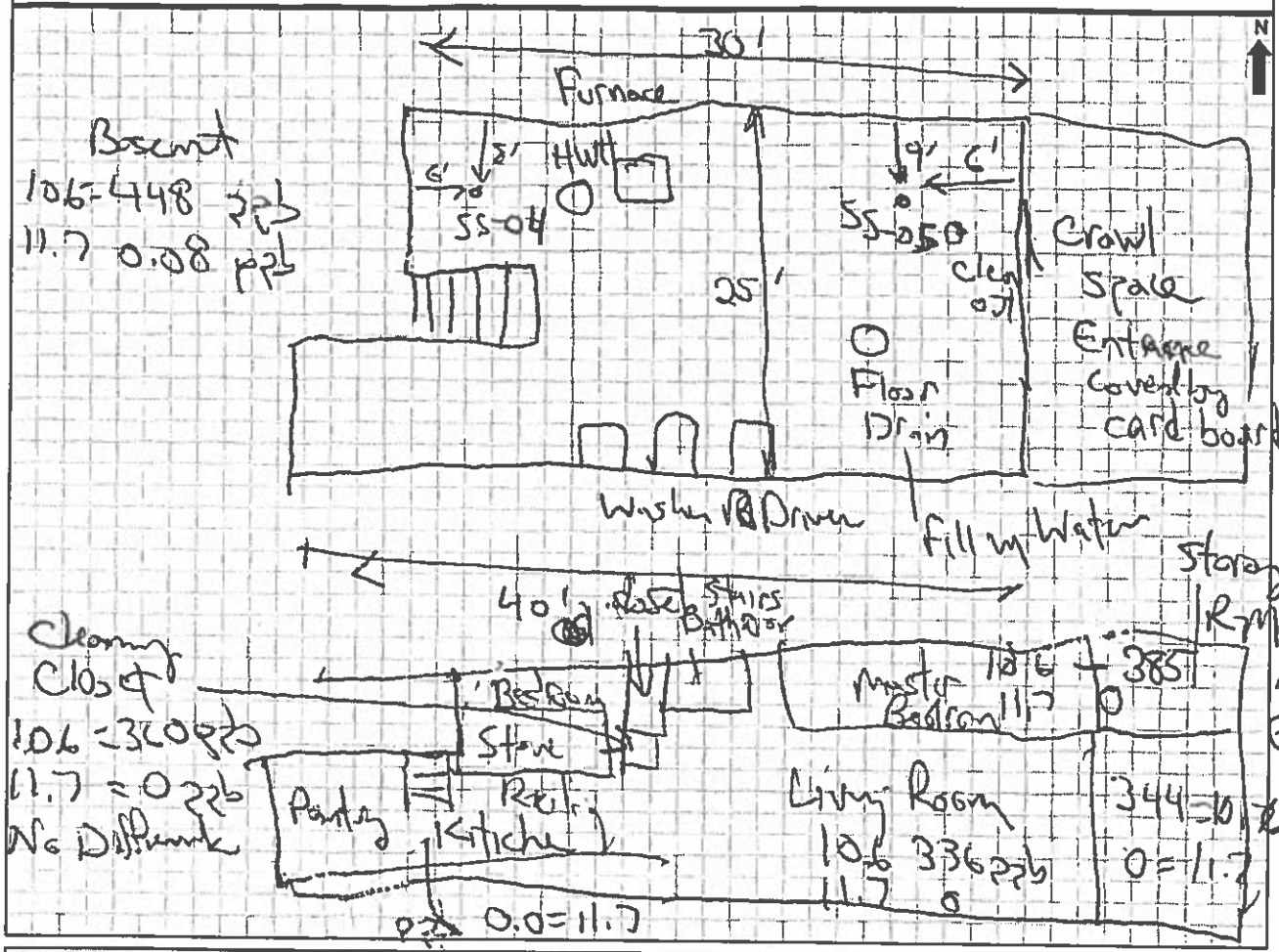
Building Survey

Building Address: [redacted] Date: 8/9/16

Building Sketch

Provide sketch of floors in house, including the following information:

- Street (sidewalk, patios, driveway, distance to house)
- Location of heating and cooling systems, including fireplace
- General location of doors and windows
- Primary chemical storage location(s)
- General orientation of garage and main rooms



Post Sampling Review

Date Noted: 8/10/16 Sampling Team: [redacted]

Has any information changed during the sampling event?

Did windows and doors remain closed? NA Open Windows

Was any dry cleaning brought home? No

Were any of the consumer products discussed yesterday used in the last 24-hours? No

Were any of the containerized products opened? NA

Notes / other information observed post-sampling: Smoking inside house No AC open Windows

Preliminary Building Survey for Vapor Intrusion Investigation

Date: 8/8/16

ch2m:

Preparer: [redacted]

Facility: [redacted]

Address: [redacted]
Rockford IL

Contact Person: [redacted]

Phone Number: [redacted]

e-mail address: [redacted]

Building Description

Building or Room Identifier: NA

Primary Activity within Building (select one):

- [ ] Manufacturing
- [ ] Storage
- [X] Other — Trucking Company office & Garage and dock
- [ ] Chemical processing
- [ ] Chemical Storage
- [ ] Administrative
- [ ] Instrumentation/Control

Historical Activities within Building (if different from above):
South Section 1970s (offices)
North Section (unknown – 1950 or older
Truck Dock, maintenance Area

Notes:

Approximate floor space Tenant — Basement - Only Park trucks

Number of floors 2 Floors — Maintenance little past

Multi-room building [X] or Single room [ ]

Ceiling height Variable 8' in offices, 10'–20' in maintenance Area

Aboveground Construction

- [X] Wood
- [ ] Concrete
- [ ] Brick
- [ ] Cinderblock
- [X] Other — Metal Siding/Wood Siding

840
2948
n,348

Floor plan attached? ☐ Yes ☒ No

Notes: See sketch

QC'ed and revised 1/17/11 KAS

Evaluation of Potential Conduits from Soil

Loading dock area is about @ grade

Floor/foundation description (check all that apply)

☐ Wood ☒ Concrete ☒ Other Brick

☒ Elevated above grade? Yes
Feet above grade: 3-4'

☒ Below grade?
Feet above grade: variable up to 10'

☐ Slab on grade?

Expansion joints present (if concrete floor)?	☒ Yes	☐ No	☐ N/A
Are expansion joints sealed?	☒ Yes	☐ No	☐ N/A Filled with soil/dirt
Are sumps or floor drains present?	☒ Yes	☐ No	☐ N/A
Are basements or subsurface vaults present?	☒ Yes	☐ No	☐ N/A
Are there subsurface drainage problems?	☐ Yes	☒ No	☐ N/A

Notes/Explanation for N/A responses: Concrete in maintence areas covered with soil

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)

None Noticed

Preliminary Building Survey for Vapor Intrusion Investigation

Is there one air conditioning zone or multiple zones (if in a multi-room building)? Dock areas are not part of AC. Have Ceily Heaters

[X] Single zone [ ] Multi-zone [ ] Other ____

office Area South Furnace AC Forced Air

(building management may know; another tip-off is the presence of multiple thermostats = multiple zones)

Sources of outdoor air

[ ] Mechanical (air handling unit) [X] Doors

[X] Windows [ ] Attic Fans No

Are windows/doors left open routinely? [ ] Yes [X] No

Notes: _____

Evaluation of Potential Existing Chemical Sources Indoors

Chemicals stored inside Semi building area

List principal solvent or VOC-containing products used (obtain MSDSs if available) Bathrooms

Chemicals are car wash/maintenance Chemicals. No PID Readings on containers and drums. Nothing Removed

Are any of the target analytes used in this building/room?

[ ] Yes [X] No

Are pesticides used indoors for pest control? [ ] Yes [X] No

Names of pesticide products used? No

Has there been a pesticide application within the past 6 months? Bed Bug treatment in the past [ ] Yes [X] No

Is smoking permitted in the building? [ ] Yes [X] No

Description of Vapor Mitigation Systems

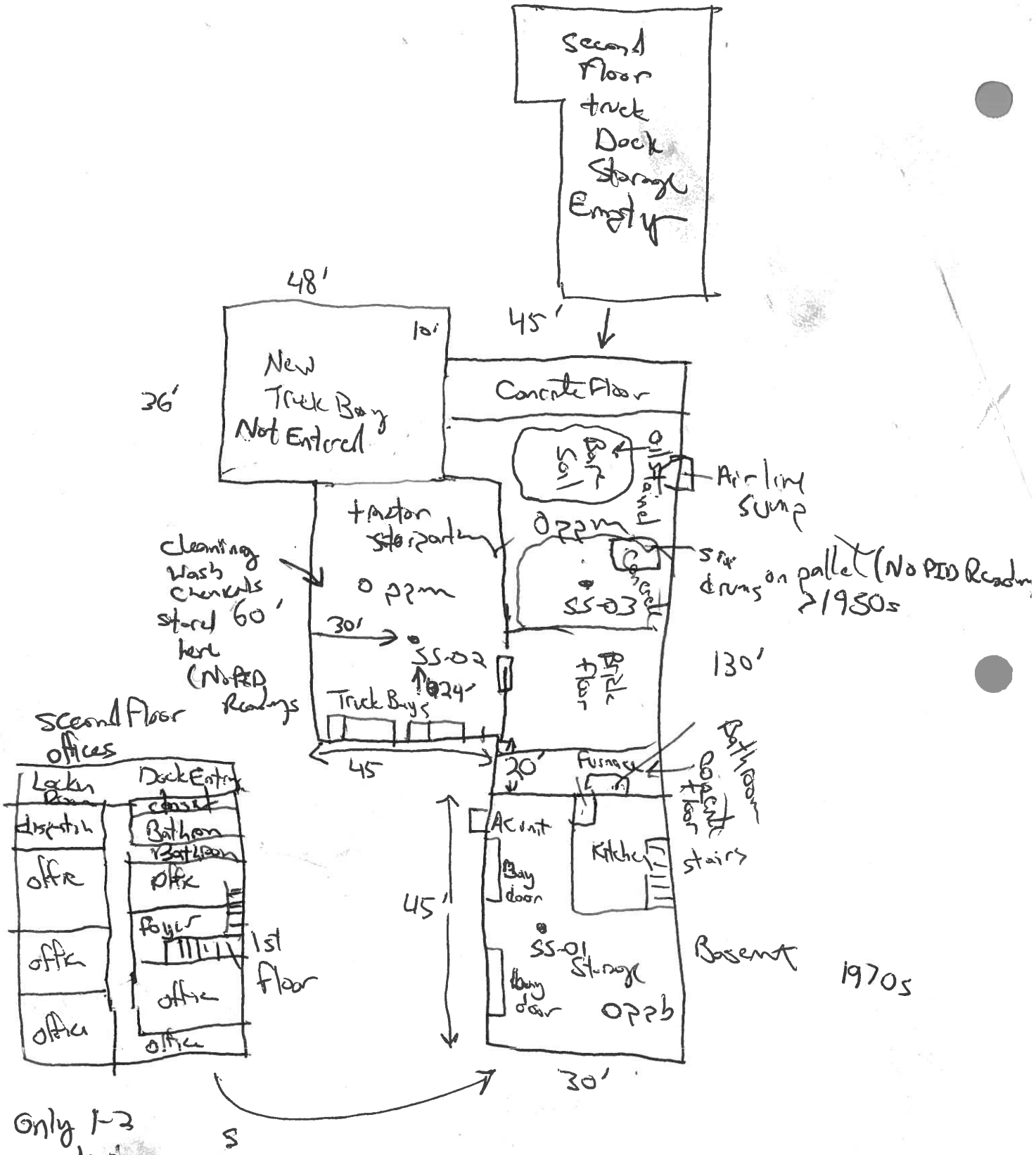
Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? NA

Type of system?

☐ Passive venting
☐ Active subslab depressurization
☐ Crack/crevice sealing
☐ Dilution ventilation control
☐ N/A NA

Notes


Second Floor truck Dock Storage Empty
48'
45'
10'
36'
New Truck Bay Not Entered
Concrete Floor
Air-line Sump
Tractor storage
0 ppm
SS-03
5 or drums on pallet (No PID Readings >1950s
Cleaning Wash Chemicals stored 60' here (No PID Readings
30'
SS-02
1024'
Truck Bays
130'
Second Floor offices
Locker Room
Dock Entry
closet
Bathroom
Bathroom
office
office
office
office
office
Foyer
1st floor
45
20'
Furnace
Bathroom
Access to stairs
AC unit
Kitchen
Bay door
45'
SS-01
Storage
Bay door
Basement
1970s
0 ppb
30'
Only 1-3 people in office
S

February 2017

Building Survey - Indoor Air Sampling

Project Information

Project Name: SE Rockford
Project #: 678601.ET.01
Survey Completed By: [redacted]
Date: 2/15/17
Building Address: [redacted]
Residence ID: Property 3

Resident and Contact Information

Name of Occupan: [redacted]
Owner / Tenant / Other: [redacted]
Occupant Phone #s: Home: [redacted] Work: [redacted] Cell [redacted]
Duration at Current Residence: [redacted]
Best Time To Call / Visit: [redacted]
Number of Building Occupants: Children (list ages): [redacted] Adults: [redacted]
(If Rental) Property Owner Name: _____ *Owner Phone #s:* *Home:* _____
Owner Address: _____ *Work:* _____
Name of Interviewee for Building Survey [redacted]
Notes: _____

Building Construction Characteristics

Building Type: (Check box for all that apply)

- [x] Single Family Residential
- [ ] Multi Family Residential
- [ ] Commercial
- [ ] Ranch
- [ ] Two-story
- [ ] Other (specify): _____
- [ ] Split Level
- [ ] Tri Level
- [ ] Duplex (# of other half of duplex): _____
- [ ] Apartment (# of units in Building): _____

Describe Building: (General Description, Construction Materials, etc.) _____

Approximate Age: Unk years **Approximate Area:** Total Living Space: 40'x20" sq.ft. First Floor: 40'x30' sq.ft.

Floors: # Floors at or above grade: 1

Which floors of the residence are utilized as living space / occupied? Both Bsmt / 1st Floor

Foundation Type:

Crawl Space: Yes / (No)
Slab on Grade: Yes / No
Basement: (Yes) / No

Foundation Description: (Split Foundation or Multiple Types) Concrete

Slab & Crawl Space Construction: Concrete

Basement or Crawl Space Details: (If applicable)

Finished Basement: (Yes) / No Basement Finished When: 13 yrs Approximate Area: 40'x30' sq.ft.

Basement or Crawl Space Floor: (Check box for all that apply)

- [x] Concrete
- [ ] Dirt
- [ ] Floating (built on top of actual floor)
- [ ] Other (specify): _____

Foundation Walls: (Check box for all that apply)

- [x] Poured Concrete
- [ ] Block
- [ ] Stone
- [ ] Other (specify): _____

Does the basement or crawl space have a moisture problem - dampness? (Check only one)

- [ ] Yes, frequently (3 or more times/year)
- [x] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [ ] No

Is the basement or crawl space ever wet - flooded? (Check only one)

- [ ] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [x] No

Building Address: Property 3 Date: 2/15/17

Basement or Crawl Space Details Continued: (If applicable)

Does the basement have any of the following? (Check all that apply)

- [ ] Floor cracks
- [ ] Wall cracks
- [ ] Floor Drain
- [x] Sump pump
- [ ] Other hole / opening in floor (describe):

Is the sump pump used? Yes / No Depth of sump? 16" Where does the sump pump drain? Septic

Describe ventilation of crawl space: None

Description of ground cover outside of building:

- [x] Grass
- [ ] Concrete
- [ ] Asphalt
- [ ] Other:

Heating & Ventilation Systems

Heating System - Fuel Type: (Check box for all that apply)

- [x] Natural Gas
- [ ] Electric
- [ ] Coal
- [ ] Fuel Oil
- [ ] Wood
- [ ] Other (specify):

Heating - Conveyance System: (Check box for all that apply)

- [x] Forced Hot Air
- [ ] Electric Baseboard
- [ ] Wood Stove
- [ ] Fireplace
- [ ] Forced Hot Water
- [ ] Hot Water Radiation
- [ ] Heat Pump
- [ ] Kerosene Heater
- [ ] Other (specify):

Type of Ventilation System: (Check box for all that apply)

- [x] Central air handler / blower
- [ ] Mechanical / ceiling fans
- [ ] Bathroom ventilation fans
- [ ] Air-to-air heat exchanger
- [ ] Kitchen range hood fan
- [ ] Other (specify):

Does the Residence have Air Conditioning: (Check box for all that apply)

- [x] Central Air Conditioning
- [ ] Window Air Conditioners
- [ ] Other (specify):

Describe the current operating conditions of the HVAC system:

Miscellaneous Information

Does the Residence have any of the following?

Septic System? Yes / Yes (but not used) / No Irrigation / Private Well? No

Existing subsurface depressurization (radon) system in place? Yes / No Is it running? Yes / No

Is there standing water outside the residence (pond, ditch, swale)? Yes / No If so, describe:

Has the residence been retrofitted / weatherized with any of the following? (Check box for all that apply) No

- [ ] Insulation
- [ ] Storm Windows
- [ ] Energy-efficient windows
- [ ] Other (specify):

Does the building have an attached garage? Yes / No If so, is a car usually parked in the garage? Yes / No

Chemicals

Have any pesticides / herbicides been applied around the building foundation or in the yard / gardens? Yes / No

If so, when - and which chemicals?

Has the residence had a pesticide treatment inside? Yes / No When / by whom?

Do the occupants of the building have their clothes dry-cleaned? Yes / No

When were dry-cleaned clothes last brought into the building? Week

Have the occupants ever noticed any unusual odors in the building? Yes / No

Describe (with location):

Building Address: Property 3 Date: 2/15/17

Miscellaneous Information Continued:

Have there been any known spills of a chemical immediately outside or inside the building? Yes / (No)

Describe (with location): _____

Do any of the occupants smoke inside the building? Yes / (No) How often? _____

Do any of the occupants use solvents at work? Yes / (No) Are their clothes washed at home? Yes / No

If so, when - and what rooms? _____

Within the last 6 months, has there been any painting or remodeling in the residence? Yes / (No) If so, when _____

What rooms, and what specifically was done? _____

Within the last 6 months, has any new carpeting been installed? Yes / (No) Have the carpets or rugs been cleaned? Yes / (No)

If so, when, what rooms, and what cleaners? _____

Consumer Products Inventory

Check consumer products that are present in the residence.

		Storage Location	Frequency of Usage	Date of Last Use
[X]	Paint or Wood Finishes (spray or can)	Basement Not	Remodel No	VOCs
[ ]	Paint stripper / remover / thinner No	No		
[ ]	Solvent cleaners (e.g.. spray-on oven cleaner) No			
[ ]	Metal degreaser / cleaner No			
[ ]	Gasoline / diesel fuel No			
[ ]	Glues or adhesives (super glue, etc.) No			
[ ]	Air fresheners & scented candles Yes	Resident will turn off		
[X]	Laundry / carpet spot removers	Basement Not	Remodel No VOCs	
[X]	Pesticides / Insecticides No			
[X]	Nail polish remover (acetone)	bathroom		
[X]	Aerosols (deodorizers, polish, cleaners)	Bathroom		
[ ]	Other: _____			
[ ]	Other: _____			
[ ]	Other: _____			

Describe any products that are containerized during sampling event:

None – No VOCs

Provide any additional information that is provided by interviewee:

None

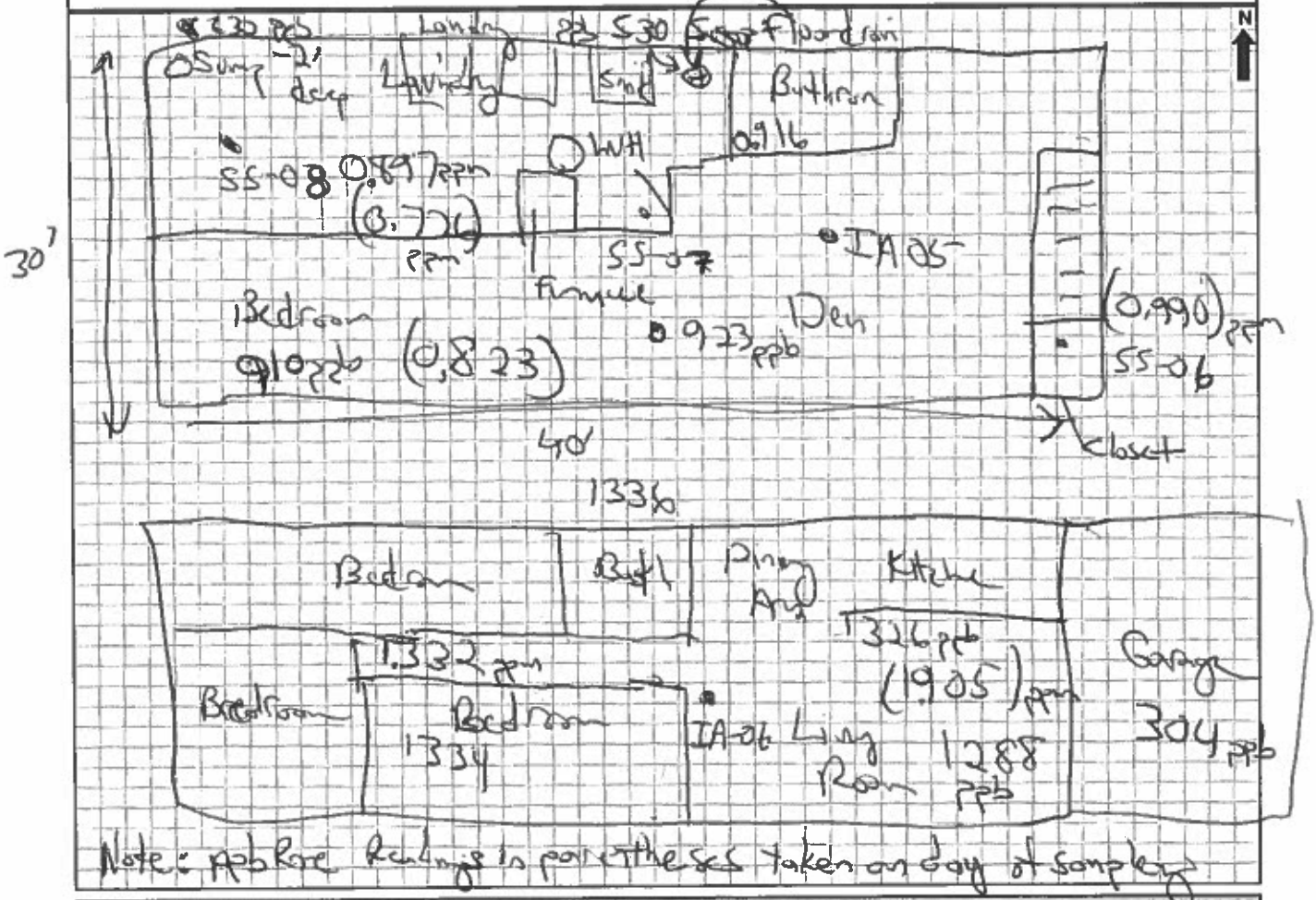
Building Survey

Building Address: Property 3 Date: 2/15/17

Building Sketch

Provide sketch of floors in house, including the following information:

- Street (sidewalk, patios, driveway, distance to house)
- Location of heating and cooling systems, including fireplace
- General location of doors and windows
- Primary chemical storage location(s)
- General orientation of garage and main rooms



Post Sampling Review

Date Noted: 2/23/17 Sampling Team: [redacted]

Has any information changed during the sampling event?

Did windows and doors remain closed? Yes

Was any dry cleaning brought home? No

Were any of the consumer products discussed yesterday used in the last 24-hours? No

Were any of the containerized products opened? No

Notes / other information observed post-sampling: None

Property 4

ch2m: **Building Survey - Indoor Air Sampling**

Project Information — Page 1 of 4

Project Name: SF Rockford — Project #: 6756
Survey Completed By: [redacted] — Date: 2/15/17
Building Address: [redacted] — Residence ID: Property 4

Resident and Contact Information

Name of Occupant: [redacted] — (Owner) / Tenant / Other:
Occupant Phone #s: Home: [redacted] Work: [redacted] Cell: [redacted]
Duration at Current Residence: [redacted] — Best Time To Call / Visit: [redacted]
Number of Building Occupants: Children (list ages): [redacted] — Adults: [redacted]
(If Rental) Property Owner Name: — *Owner Phone #s:* *Home:*
Owner Address: — *Work:*
Name of Interviewee for Building Survey: [redacted] — Notes:

Building Construction Characteristics

Building Type: (Check box for all that apply)

- [X] Single Family Residential
- [ ] Multi Family Residential
- [ ] Commercial
- [ ] Ranch
- [ ] Two-story
- [ ] Other (specify):
- [ ] Split Level
- [ ] Tri Level
- [ ] Duplex (# of other half of duplex):
- [ ] Apartment (# of units in Building):

Describe Building: (General Description, Construction Materials, etc.) Siding & Brick

Approximate Age: 1987 years — **Approximate Area:** Total Living Space: Don't know sq.ft. — First Floor: sq.ft.

Floors: # Floors at or above grade: 1 | 1st Floor / Basement 30'x40'

Which floors of the residence are utilized as living space / occupied? Both

Foundation Type:

Crawl Space: Yes / (No)
Slab on Grade: Yes / (No)
Basement: (Yes) / No

Foundation Description: (Split Foundation or Multiple Types) Concrete

Slab & Crawl Space Construction: Concrete

Basement or Crawl Space Details: (if applicable)

Finished Basement: (Yes) / No — Basement Finished When: Yes Unknown — Approximate Area: 30x40 sq.ft.

Basement or Crawl Space Floor: (Check box for all that apply)

- [X] Concrete
- [ ] Dirt
- [ ] Floating (built on top of actual floor)
- [ ] Other (specify):

Foundation Walls: (Check box for all that apply)

- [X] Poured Concrete
- [ ] Block
- [ ] Stone
- [ ] Other (specify):

Does the basement or crawl space have a moisture problem - dampness? (Check only one)

- [ ] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [ ] No — No crawl space

Is the basement or crawl space ever wet - flooded? (Check only one)

- [ ] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [X] No

Building Address: Property 1 Date: 2/15/12

Basement or Crawl Space Details Continued: (if applicable)

Does the basement have any of the following? (Check all that apply)

☒ Floor cracks ☐ Wall cracks ☐ Floor Drain ☒ Sump pump

☐ Other hole / opening in floor (describe): None

Is the sump pump used? (Yes) / No Depth of sump? 3 ft Where does the sump pump drain? Septic

Describe ventilation of crawl space: NA

Description of ground cover outside of building: ☒ Grass ☐ Concrete ☐ Asphalt ☐ Other:

Heating & Ventilation Systems

Heating System - Fuel Type: (Check box for all that apply)

☒ Natural Gas ☐ Electric ☐ Coal ☐ Fuel Oil

☐ Wood ☐ Other (specify):

Heating - Conveyance System: (Check box for all that apply)

☒ Forced Hot Air ☐ Electric Baseboard ☐ Wood Stove ☐ Fireplace

☐ Forced Hot Water ☐ Hot Water Radiation ☐ Heat Pump ☐ Kerosene Heater

☐ Other (specify):

Type of Ventilation System: (Check box for all that apply)

☒ Central air handler / blower ☐ Mechanical / ceiling fans ☐ Bathroom ventilation fans ☐ Air-to-air heat exchanger

☐ Kitchen range hood fan ☐ Other (specify):

Does the Residence have Air Conditioning: (Check box for all that apply)

☒ Central Air Conditioning ☐ Window Air Conditioners ☐ Other (specify):

Describe the current operating conditions of the HVAC system: Heater

Miscellaneous Information

Does the Residence have any of the following?

Septic System? (Yes) / Yes (but not used) / No Irrigation / Private Well? No

Existing subsurface depressurization (radon) system in place? Yes / (No) Is it running? Yes / No NA

Is there standing water outside the residence (pond, ditch, swale)? Yes / (No) If so, describe:

Has the residence been retrofitted / weatherized with any of the following? (Check box for all that apply) No

☐ Insulation ☐ Storm Windows ☐ Energy-efficient windows ☐ Other (specify):

Does the building have an attached garage? Yes / (No) If so, is a car usually parked in the garage? Yes / No

Chemicals New floor Mats

Have any pesticides / herbicides been applied around the building foundation or in the yard / gardens? Yes / (No)

If so, when - and which chemicals?

Has the residence had a pesticide treatment inside? Yes / (No) When / by whom?

Do the occupants of the building have their clothes dry-cleaned? Yes / (No)

When were dry-cleaned clothes last brought into the building?

Have the occupants ever noticed any unusual odors in the building? Yes / (No)

Describe (with location):

Building Address: Property 2 Date: 2/15/17

Miscellaneous Information Continued:

Have there been any known spills of a chemical immediately outside or inside the building? Yes / (No)

Describe (with location): _____

Do any of the occupants smoke inside the building? Yes / (No) How often? _____

Do any of the occupants use solvents at work? Yes / (No) Are their clothes washed at home? Yes / No

If so, when - and what rooms? _____

Within the last 6 months, has there been any painting or remodeling in the residence? (Yes) / No If so, when _____

What rooms, and what specifically was done? New floor 1 month ago

Within the last 6 months, has any new carpeting been installed? Yes / (No) Have the carpets or rugs been cleaned? Yes / (No)

If so, when, what rooms, and what cleaners? _____

Consumer Products Inventory

Check consumer products that are present in the residence.

		Storage Location	Frequency of Usage	Date of Last Use
[X]	Paint or Wood Finishes (spray or can) 3 cans	Basement Laundry Room		Mt. VOCs
[ ]	Paint stripper / remover / thinner			
[ ]	Solvent cleaners (e.g.. spray-on oven cleaner)			
[ ]	Metal degreaser / cleaner			
[ ]	Gasoline / diesel fuel			
[ ]	Glues or adhesives (super glue, etc.)			
[ ]	Air fresheners & scented candles			
[X]	Laundry / carpet spot removers Normal Laundry Supplies			
[ ]	Pesticides / Insecticides			
[ ]	Nail polish remover (acetone)			
[ ]	Aerosols (deodorizers, polish, cleaners)			
[ ]	Other: _____			
[ ]	Other: _____			
[ ]	Other: _____			

Describe any products that are containerized during sampling event:

None

Provide any additional information that is provided by interviewee:

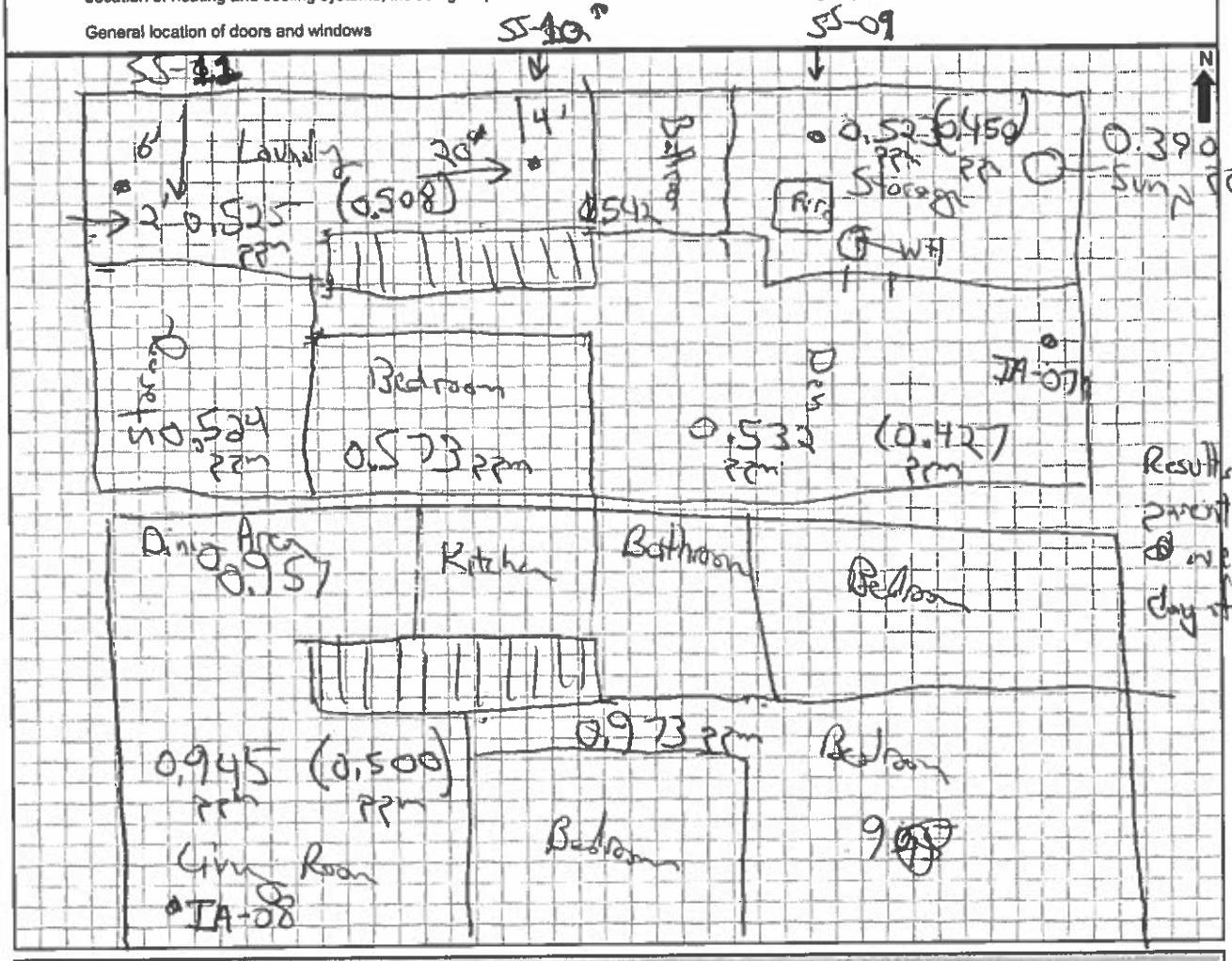
Building Survey

Building Address: Property 4 Date: 2/15/17

Building Sketch

Provide sketch of floors in house, including the following information:

- Street (sidewalk, patios, driveway, distance to house)
- Location of heating and cooling systems, including fireplace
- General location of doors and windows
- Primary chemical storage location(s)
- General orientation of garage and main rooms



Results in parentheses are ... measure ... day of sampling

Post Sampling Review

Date Noted: 2/23/17 Sampling Team: [redacted]

Has any information changed during the sampling event?

Did windows and doors remain closed? yes

Was any dry cleaning brought home? no

Were any of the consumer products discussed yesterday used in the last 24-hours? no

Were any of the containerized products opened? no

Notes / other information observed post-sampling: None

June 2017

Prepared by: [redacted]
Date: 6/7/17

Building Survey Update

6/7/17 Property 3

- No exterior Changes to Building
- Some Rain Events
- No plug in air fresheners
- Resident had added to quantity of household cleaning products stored in the basement. Due to # of containers ~~material~~ products could not be removed. No elevated PID readings around products.
- No other additional Chemicals

PID Readings

1.18	ppm	Basement Den
1.163	ppm	Basement Bathroom
1.17	ppm	Basement Bedroom
1.163	ppm	Basement Laundry Room
1.194	ppm	1st fl, Kitchen
1.245	ppm	1st fl. Living Room
1.213	ppm	1st fl hallway
1.210	ppm	1st fl Bedroom west end.

Prepared by [redacted]
Date: 6/7/17

Building Survey Update
6/7/17 Property 4

No Exterior changes to building
Same Residents
No New chemicals in house
No plug in air fresheners
PID Readings

563 ppb NE corner / SS-09 Basement
560 ppb Den Basement
559 ppb Laundry Room Basement
547 ppb Storage Room SW corner Basement
657 ppb Dining Room 1st Floor
665 ppb Living Room 1st Floor

Prepared by: [redacted]
Date: 6/16/17

Building Survey Update
6/10/17 [redacted]

Property 6 (Residential Property)

No Exterior changes to building
Same residents
Both Residents Smoke in-side building
No AC- Windows open during sampling
No new chemicals in the house

PID Readings

80 ppb east end of basement (SS-05)
75 ppb west end of basement (SS-04)
590-720 ppb west end of first floor
530 ppb Kitchen
600 ppb West end of living Room
5200 ppb East end of living Room

Attachment 6
Subslab Soil Gas, and Indoor, Crawlspace, and Outdoor Air Sampling Forms

August 2016

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 671601.ET.01
Sampler Name: [redacted]
Date: 8/16/16

Structure

Identification: SS-4 ~~SS-5~~ ~~SS-6~~ West Property 6 (Residential Property)
Address: [redacted]
Slab Information:
Condition of slab: Good
Describe material under the slab (gravel, sand, etc.): Sand
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Basement Storage - West side
Probe and Sample Identification (field ID)		SER-SS-04-0816
Probe Installation	Date and time	8/9/16 1320
	Thickness of slab (inches)	4"
	Depth of hole drilled (inches below slab surface)	~~0.1-0.119 22m~~ 4"
	Total VOCs measure in hole with PID (ppmv)	0.1-0.119 22m
	Depth of installed probe (inches below slab surface)	3"
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200ml/min
	Purge start time	1154
	Purge vacuum (" Hg)	0
	Purge completion time	1200
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis MultiRAE PID	O2 (%)	16.2
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	8
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AS00974
	Flow controller ID	FRCR00108
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~24 hr~~ 24hr 7mn
	Sample start date and time	1220 8/16/16
	Initial canister pressure (" Hg)	-29.34
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1227 8/17/16
	Final canister pressure (" Hg)	-8.59

Weather conditions during sampling:
Humid Sunny 80s

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678-60-8 ETool
Sampler Name: [redacted]
Date: 8/16/16

Structure

Identification: SS-5 - East End of Basement
Property 6 (Residential Property)
Address: [redacted]
Slab Information:
Condition of slab: Good
East end of Basement
Describe material under the slab (gravel, sand, etc.): Sand.
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SER-SS-05-0816/-D
Probe and Sample Identification (field ID)		SS-5 (from field book)
Probe Installation	Date and time	8/9/16 1340
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	8"
	Total VOCs measure in hole with PID (ppmv)	0480-0.791 ppm
	Depth of installed probe (inches below slab surface)	3"
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200 ml/min
	Purge start time	1138
	Purge vacuum (" Hg)	0
	Purge completion time	1143
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	18.2	
MultiRAE PID	CO (ppm)	0	
	H2S (ppm)	0	
	LEL (%)	8	
	Total VOCs (ppm)	0	
Canister Sampling	Canister ID	Primary: A501011	#C02119 Duplicate
	Flow controller ID	FCR03113	FRR00109
	Pressure gauge ID (optional)	NA	Gauge Not Working
	Sampling rate or period (mL/min or hours)	24hr23hr 55min	
	Sample start date and time	1219 8/16/16	
	Initial canister pressure (" Hg)	-29.40	-29.45
	Sampling vacuum (" Hg)	NA	
	Sample completion date and time	11:12	11:12 8/17/16
	Final canister pressure (" Hg)	-6.89	-7.5)

Weather conditions during sampling:
Humid, Sun 80s

Observations and Comments:

SE Rockford

ch2m:

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method [redacted] Property 6 (Residential Property)

Field ID	Bldg #	Location Description	Canister ID	Pressure Gauge ID	Flow Controller ID	Flow Controller Rate	Sample Start Date	Sample Start Time	Initial Canister Pressure ("Hg)	20-hr Check Time	20-hr Check Pressure ("Hg)	Sample End Date	Sample End Time	Final Pressure ("Hg)	Indoor Temp (°F)	Outdoor weather conditions	
SCS-01-0816	NA	Crawl Space East End Basement	AC00-716	NA	FCR 00086	24hr	8/16/16	1218	-28.91	1125	-7	8/17/16	1125	-6.80	70s	Sunny 270s	Flow Controller Leak Check pass
CS-01-0816-D	ND	DUP	AC01-638	NA	FCR 00069	24h	8/16/16	1218	-29.47	1125	-11	8/17/16	1125	-8.55	70s	Sunny 70s	
IA-03-0816	ND	Kitchen	AC02 036	NA	FCR 00167	24h	8/16/16	1225	-29.30	1108	+0.11	8/17/16	1108	+0.11	70s	Sunny 70s	Equalized - Can Valve moves - possible leak
IA-04-0816	ND	Living Room on speakers	AS01139	NA	FCR 00134	24h	8/16/16	1233	-29.28	1108	-13	8/17/16	1215	-8.03	70s	"	
IA-04-0816-D	ND	Living Room on speakers	AS01132	NA	FCR 00125	24h	8/16/16	1233	-29.14	1108	-11	8/17/16	1215	-7.10	70s	"	
OA-01-0816	ND	West side on Pop. on dog kennel	AS00 682	NA	FCR00 193	24h	8/16/16	1245	-28.74	1150	-6	8/17/16	1150	-5.94	70s	Sunny 70s	
OA-01-0816-D	ND	"	AC020 26	NA	FCR00 093	24h	8/16/16	1245	-29.42	1150	-7	8/17/16	1150	-6.70	70s	Sunny 70s	
field duplicate																	

Building has no AC Open Windows, Smoker

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601-ET.01

Sampler Name: [redacted] Date: 8/17/16

Structure

Identification: [redacted] SS0-1 Property 5 (Commercial Property)

Address:

Slab Information:

Condition of slab: Good

Describe material under the slab (gravel, sand, etc.): Sand

Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

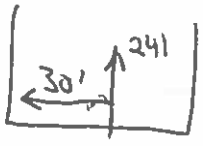
Sample location (describe and show in diagram)		SS-01 Basement of Rear Building
Probe and Sample Identification (field ID)		SER-SS-01-0816
Probe Installation	Date and time	8/8/16 1501
	Thickness of slab (inches)	4"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0,000
	Depth of installed probe (inches below slab surface)	3"
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	0.2 ml/min
	Purge start time	0803
	Purge vacuum (" Hg)	0
	Purge completion time	0808
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis MultiRAE PID	O2 (%)	19.9
	CO (ppm)	33
	H2S (ppm)	0.0
	LEL (%) Not calibrated	6
	Total VOCs (ppm)	0.0
Canister Sampling	Canister ID	AS00996
	Flow controller ID	FCA-01029
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~8hr~~ 7hr 42
	Sample start date and time	8/17/16 0811
	Initial canister pressure (" Hg)	-28.72
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1553 8/17/16
	Final canister pressure (" Hg)	-5.78

Weather conditions during sampling: Sunny

Observations and Comments:



ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.07
Sampler Name: [redacted]
Date: 8/17/16

Structure

Identification: SER-SS-02-0816
Property 5 (Commercial Property)
Address: [redacted]
Slab Information:
Condition of slab: Covered with dirt/soil/unknown
Describe material under the slab (gravel, sand, etc.): Soil
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Truck Bay
Probe and Sample Identification (field ID)		SER-SS-02-08
Probe Installation	Date and time	1520 8/8/16
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	8"
	Total VOCs measure in hole with PID (ppmv)	10.6-11.7 ppm
	Depth of installed probe (inches below slab surface)	3"
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	0.2 ml/min
	Purge start time	0824
	Purge vacuum (" Hg)	0
	Purge completion time	0829
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	16.0
MultiRAE PID	CO (ppm)	6
	H2S (ppm)	0.0
	LEL (%)	7
	Total VOCs (ppm)	0.0
Canister Sampling	Canister ID	SC00980
	Flow controller ID	FCA00057
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~8 hr~~ 7hr. 32mn
	Sample start date and time	8/17/16 0832
	Initial canister pressure (" Hg)	-29.35
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1554 8/15/16
	Final canister pressure (" Hg)	-9.19

Weather conditions during sampling: Sunny 70s Calm Wind

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601-ET-01
Sampler Name: [redacted]
Date: 8/17/16

Structure

Identification: SER-SS-03-0816
Property 5 (Commercial Property)
Address: [redacted]
Slab Information:
Condition of slab: Covered with soil/dirt
Describe material under the slab (gravel, sand, etc.): sand
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Maintenance Bay
Probe and Sample Identification (field ID)		SER-SS-03-0816
Probe Installation	Date and time	1545 8/8/16
	Thickness of slab (inches)	4"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0.000 ppm
	Depth of installed probe (inches below slab surface)	3"
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	0.2/LPM
	Purge start time	0843
	Purge vacuum (" Hg)	0
	Purge completion time	0849
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	19.5
MultiRAE PID	CO (ppm)	0
	H2S (ppm)	0.0
	LEL (%) would not calibrate	4
	Total VOCs (ppm)	0.0
Canister Sampling	Canister ID	AS00393
	Flow controller ID	FCA-00825
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~8 hr~~ 7 hr. 35 min
	Sample start date and time	8/17/16 0851
	Initial canister pressure (" Hg)	-29.41
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1626 8/17/16
	Final canister pressure (" Hg)	-8.45

Weather conditions during sampling: Sunny 80s

Observations and Comments:

ch2m

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method [redacted]

Property 5 (Commercial Property)

Field ID	Bldg #	Location Description	Canister ID	Pressure Gauge ID	Flow Controller ID	Flow Controller Rate	Sample Start Date	Sample Start Time	Initial Canister Pressure ("Hg)	20-hr Check Time	20-hr Check Pressure ("Hg)	Sample End Date	Sample End Time	Final Pressure ("Hg)	Indoor Temp (°F)	Outdoor weather conditions
SER-OA-02-0816		NE corner of Maintenance building upwind	AS00922	NA	FCA00474	8hr	8/17/16	0735	-29.99	1500	-11.5	8/17/16	1559	-7.84	75°	Sunny 80s
SER-IA-01-0816		[redacted] office	AS00743	NA	FCA01622	8hr	8/17/16	0750	-29.36	1500	-14	8/17/16	1551	-6.74	75°	Sunny 80s
SER-IA-02-0816		[redacted] Hall Wall North	AC01830	NA	FCA00691	8hr	8/17/16	0753	-29.33	1500	10	8/17/16	1552	-7.07	75°	Sunny 80s
field duplicate																

December 2016

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601.ET.01

Sampler Name: [redacted] Date: 11/28/16

Structure

Identification: [redacted] Property 6 (Residential Property)

Address: [redacted]

Slab Information:

Condition of slab: Fair

Describe material under the slab (gravel, sand, etc.): See Previous Report

Is water present in the soil? See Previous Report

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SS-04 / Basement West Room
Probe and Sample Identification (field ID)		SER-SS-04-1116
Probe Installation	Date and time	See Previous
	Thickness of slab (inches)	
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200 mL/min
	Purge start time	1441
	Purge vacuum (" Hg)	7.0 " Hg
	Purge completion time	1449
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	~~20.5~~ 20.5
MultiRae PID	CO (ppm)	3
	H2S (ppm)	0
	LEL (%)	2
	Total VOCs (ppm)	0.0
Canister Sampling	Canister ID	AS01625
	Flow controller ID	FCR00032
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~6L/24 hrs~~ 22hrs 23min
	Sample start date and time	11/28/16 @ 1506
	Initial canister pressure (" Hg)	-28.73" Hg
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	11/29/16 @ 1329
	Final canister pressure (" Hg)	-6.18" Hg

Weather conditions during sampling: Heavy Rain @ start, Clear at end

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 11/28/16

Structure

Identification: [redacted] Property 6 (Residential Property)
Address: [redacted]
Slab Information:
Condition of slab: Fair
Describe material under the slab (gravel, sand, etc.): See Previous Report
Is water present in the soil? See Previous Report

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		East side of basement
Probe and Sample Identification (field ID)		SS-05 / SER-SS-05-1116 / SER-SS-05-1116-FD
Probe Installation	Date and time	See Previous
	Thickness of slab (inches)	
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200 mL/min
	Purge start time	1429
	Purge vacuum (" Hg)	0.0 " Hg
	Purge completion time	1434
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	20.9	
MultiRae PID	CO (ppm)	0	
	H2S (ppm)	0	
	LEL (%)	0	
	Total VOCs (ppm)	0.0	
Canister Sampling	Canister ID	AC02164	AS01040
	Flow controller ID	FCR00111	FCR00188
	Pressure gauge ID (optional)	NA	NA
	Sampling rate or period (mL/min or hours)	~~6L/24hrs~~	~~6L/24hrs~~ 22hrs 25min
	Sample start date and time	11/28/16 @ 1505	11/28/16 @ 1505
	Initial canister pressure (" Hg)	-28.79 "Hg	-28.77 "Hg
	Sampling vacuum (" Hg)	NA	NA
	Sample completion date and time	11/29/16 @ 1330	11/29/16 @ 1330
	Final canister pressure (" Hg)	-6.40	-7.80

SER-SS05-1116 SER-SS-05-1116-FD

Weather conditions during sampling: Heavy Rain @ start Overcast

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

[redacted]

Property 6 (Residential Property)

Field ID	Bldg #	Location Description	Canister ID	Pressure Gauge ID	Flow Controller ID	Flow Controller Rate	Sample Start Date	Sample Start Time	Initial Canister Pressure ("Hg)	20-hr Check Time	20-hr Check Pressure ("Hg)	Sample End Date	Sample End Time	Final Pressure ("Hg)	Indoor Temp (°F)	Outdoor weather conditions
SER-CS-01-1116-FD		Basement East End Duplicate	AS00952		FCR00-224	6L/24hr	11/28/16	1502	-28.82			11/29/16	1328	-8.85	60-65	Rain/Sun
SER-CS-01-1116		Basement East End	AS01218		FCR000-79	6L/24 hr	11/28/16	1502	-28.78			11/29/16	1328	-7.61	60-65	Rain/Sun
SER-IA-03-1116		Basement SE Corner	AC013-08		FCR-00079	6L/24 hr	11/28/16	1508	-28.60			11/29/16	1330	-7.03	60-65	Rain/Sun
SER-IA-03-1116-FD		Basement DUP SE Corner	AS00726		FCR00216	6L/24	11/28/16	1508	-28.32			11/29/16	1330	-2.45	60-65	Rain Sun
SER-IA-04-1116		1st Floor	AS00930		FCR00-238	6L/24 hr	11/28/16	1511	-28.74			11/29/16	1342	-6.80	70s	Rain/Sun
SER-OA-01-1116		outdoor Air	AS01004		FCR-00214	6L/24hr	11/28/16	1533	-28.70			11/29/16	1325	-5.29	40s	Rain/Sun
SER-OA-01-1116-FD		Outdoor Air Duplicate	AS01058		FCR00184	6L/24 hr	11/28/16	1533	-28.60			11/29/16	1325	-6.03	40s	Rain/Sun
field duplicate																

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford | Project #: 628601.ET.01
Sampler Name: [redacted] | Date: 11/30/16

Structure

Identification: SER-SS-01-1116 ;Property 5 (Commercial Property)
Address: [redacted]
Slab Information:
Condition of slab: Good Minor Cracks
Describe material under the slab (gravel, sand, etc.): See previous
Is water present in the soil? See previous

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Basement of office Building
Probe and Sample Identification (field ID)		SER-SS-01-1116
Probe Installation	Date and time	See previous
	Thickness of slab (inches)	
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200mL/min
	Purge start time	0743
	Purge vacuum (" Hg)	0
	Purge completion time	
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	16.2
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0.0
	LEL (%)	NA
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	SC02164
	Flow controller ID	FC00781
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6L/8hr
	Sample start date and time	11/30/16 0842
	Initial canister pressure (" Hg)	-28.96
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	11/30/16 @ 1540
	Final canister pressure (" Hg)	-0.96

Weather conditions during sampling: Clear 30° SW wind light

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 11/30/16

Structure

Identification: Truck Bay
Property 5 (Commercial Property)
Address: [redacted]
Slab Information:
Condition of slab: Fair
Describe material under the slab (gravel, sand, etc.): see previous
Is water present in the soil? see previous

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Truck Bay
Probe and Sample Identification (field ID)		SER-SS-02-1116
Probe Installation	Date and time	
	Thickness of slab (inches)	See Previous
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	No Pass / Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	~~0814~~ 0820
	Purge vacuum (" Hg)	0
	Purge completion time	0825
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	13.3
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0.0
	LEL (%)	NA
	Total VOCs (ppm)	0.0
Canister Sampling	Canister ID	SC01495
	Flow controller ID	~~FC400034~~ failed
	Pressure gauge ID (optional)	PC400457 / Pass
	Sampling rate or period (mL/min or hours)	6L / 8 hr
	Sample start date and time	11/30/16 0840
	Initial canister pressure (" Hg)	-29.09
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	11/30/16 @ 1546
	Final canister pressure (" Hg)	-7.57

Weather conditions during sampling: Cloudy 35

Observations and Comments: Diesel exhaust smell in area
Failed 1st manifold check, isolate problem to Flow Controller. Replace flow controlling system passed
Tedlar bag had a hole so probe was purged twice

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Redford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 11/30/16

Structure

Identification: Maintenance Bay
Property 5 (Commercial Property)
Address: [redacted]
Slab Information:
Condition of slab: Good
Describe material under the slab (gravel, sand, etc.): see previous
Is water present in the soil? see previous

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		Maintenance Bay
Probe and Sample Identification (field ID)		SER-SS-03-1116
Probe Installation	Date and time	
	Thickness of slab (inches)	See previous
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	0831
	Purge vacuum (" Hg)	0
	Purge completion time	0836
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	18.5
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0.0
	LEL (%)	NA
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	SC02089
	Flow controller ID	FCA00731
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6L/8hr
	Sample start date and time	11/30/16 0839
	Initial canister pressure (" Hg)	-29.02
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	11/30/16 @ 1545
	Final canister pressure (" Hg)	-8.27

Weather conditions during sampling: Cloudy 35

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

[redacted]

Property 5 (Commercial Property)

Field ID	Bldg #	Location Description	Canister ID	Pressure Gauge ID	Flow Controller ID	Flow Controller Rate	Sample Start Date	Sample Start Time	Initial Canister Pressure ("Hg)	20-hr Check Time	20-hr Check Pressure ("Hg)	Sample End Date	Sample End Time	Final Pressure ("Hg)	Indoor Temp (°F)	Outdoor weather conditions
SER-IA-01-1116		1st Floor Office	AS00-902	NA	FCA00228	6L/8hr	11/30/16	0848	-25.47	\	\	11/30/16	1537	-1.37	70	30° cloudy
SER-IA-02-1116		Hallway North	AC016-45	NA	ECA00763	6L/8hr	11/30/16	0847	-25.58	\	\	11/30/16	1537	-9.26	70°	30° cloudy
SER-OA-02-1116		Outside Air	AS00-799	NA	PFCA02755	6L/8hr	11/30/16	0902	28.80	\	\	11/30/16	1600	-7.23	30°	30° cloudy
field duplicate																

February 2017

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601-ET.01

Sampler Name: [redacted] Date: ~~2/15/17~~ 2/22/17

Structure 2/15/17

Identification: ~~SS-07~~ SS-06

Address: Property 3

Slab Information:

Condition of slab: Good

Describe material under the slab (gravel, sand, etc.): Gravel/Sand

Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)		SER-SS-06-017
Probe Installation	Date and time	1630 2/15/17
	Thickness of slab (inches)	5" 15
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	1205 ppm
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1645
	Purge vacuum (" Hg)	0
	Purge completion time	1651
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	19.2
MultiRAE PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	2.0 / 1.6 ppm
Canister Sampling	Canister ID	AC00256
	Flow controller ID	FRC00234
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	24hr / 6L 22hr 10 min
	Sample start date and time	1658 2/22/17
	Initial canister pressure (" Hg)	-28.87
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1508 2/23/17
	Final canister pressure (" Hg)	-5.93

Weather conditions during sampling: Sunny SW wind, 10-20 mph, 70°

Observations and Comments: —

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project # : 678601-ET-01

Sampler Name: [redacted] Date: ~~2/15/17~~ + 2/23/17 2/15/17

Structure

Identification: ~~SS-02~~ Laundry Room behind door SS-07

Address: Property 3

Slab Information:

Condition of slab: Good

Describe material under the slab (gravel, sand, etc.): Sand / Gravel

Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SS-07 [redacted]
Probe and Sample Identification (field ID)		SER-SS-07-0217
Probe Installation	Date and time	1645 2/15/17
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0.620 ppm
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1632
	Purge vacuum (" Hg)	0
	Purge completion time	1637
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	18.9
MultiRAE PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0 / 0.962 ppm Room
Canister Sampling	Canister ID	9500623
	Flow controller ID	FCR00216
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~24 hr~~ 22hr. 9am
	Sample start date and time	~~1655~~ 1658 2/22/17
	Initial canister pressure (" Hg)	-28.94
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1507 2/23/17
	Final canister pressure (" Hg)	-4.29

Weather conditions during sampling: Sunny, SW Wind, 10-20 mph, 70°

Observations and Comments: —

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601-CT-01
Sampler Name: [redacted]
Date: ~~3/15/17~~ 2/15/17

Structure

Identification: Property 3 ~~SS-03~~ SS-08
Address: Property 3
Slab Information:
Condition of slab: Good
Describe material under the slab (gravel, sand, etc.): Sand gravel
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SS-08 [redacted]
Probe and Sample Identification (field ID)		SFR-SS-08-0217 / SFR-SS-08-0217-FD
Probe Installation	Date and time	1705 2/15/17
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0.523 ppm
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1615
	Purge vacuum (" Hg)	0
	Purge completion time	~~1622~~ 1622
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis	O2 (%)	19.3
MultiRAE PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0 / 0.168 ppm Rm
Canister Sampling	Canister ID	AC02014 / AS00962
	Flow controller ID	FCR00112 / FCR00176
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	24hr/6L 22w. 6m
	Sample start date and time	1657 12/22/17
	Initial canister pressure (" Hg)	28.90 / 28.45
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1505
	Final canister pressure (" Hg)	-6.35 / -6.9

Weather conditions during sampling: Sunny, SW wind 10-20 mph 70°

Observations and Comments: —

ch2m:

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

Property ID	Property 3
Sampling Period (8 or 24 hour?)	24 hr
Sample Start Date	2/22/17
Sample End Date	2/23/17
Interior Temperature	70°

Sample ID	Location Description	Canister ID	Flow Controller ID	Sample Start Time	Initial Canister Pressure ("Hg)	Sample End Time	Final Pressure ("Hg)
SER-IA-05-0217	~~Bsmt~~ Basement Center of Room	AC02251	FCR00203	1656	-28.80	1505	-7.64
SER-IA-06-0217	1st Floor	AC02226	FCR00295	1707	-28.87	1503	-8.43
SER-OA-03-0217	Backyard on Fence	AS00870	FCR00126	1711	-28.80	1526	-6.91
SER-OA-03-0217-FD	Backyard on Fence	AC01938	FCR00274	1711	-28.52	1526	-6.24

ch2m:

Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford Project #: 678601-ET.01

Sampler Name: [redacted] Date: 2/15/17

Structure

Identification: Property 4

Address:

Slab Information:

Condition of slab: Good

Describe material under the slab (gravel, sand, etc.): Sand

Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	SS-09 [redacted]	
Probe and Sample Identification (field ID)	SER-SS-09-0217	
Probe Installation	Date and time	1415
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0,325
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1352
	Purge vacuum (" Hg)	0
	Purge completion time	1359
Water Dam Leak Check*	Leak check (pass or fail?)	pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis MultiRAE PID	O2 (%)	19.5
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.0 / 3888 ppb Rev
Canister Sampling	Canister ID	SC00937
	Flow controller ID	FC00018
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~0.24hr / 6L~~ 2 hr 53 min
	Sample start date and time	2/22/17 1445
	Initial canister pressure (" Hg)	-29.00
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1338 2/23/17
	Final canister pressure (" Hg)	-7.06

Weather conditions during sampling: Sunny SW Wind, 10-20 mph 70°

Observations and Comments: —

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SF Parkland
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 2/15/17

Structure

Identification: Property 84
Address:
Slab Information:
Condition of slab: Good
Describe material under the slab (gravel, sand, etc.): gravel/sand
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	SS-dup [redacted]	
Probe and Sample Identification (field ID)	SER-SS-10-0217	
Probe Installation	Date and time	1435
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0.237 ppm
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1415
	Purge vacuum (" Hg)	0
	Purge completion time	1420
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis MultiRAE PID	O2 (%)	19.5
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.2/3.432 ppb Re
Canister Sampling	Canister ID	SC00240
	Flow controller ID	FC00016
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	6L/24hr 22mL/7mM
	Sample start date and time	2/22/17 1452
	Initial canister pressure (" Hg)	-28.93
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1339 2/23/17
	Final canister pressure (" Hg)	-5.92

Weather conditions during sampling: Sunny, SW Wind, 10-20 mph 70°

Observations and Comments:

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #:
Sampler Name: [redacted]
Date: 2/15/17

Structure

Identification: Property 4
Address: [redacted]
Slab Information:
Condition of slab: Good
Describe material under the slab (gravel, sand, etc.): Sand/Gravel
Is water present in the soil? No

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SS-04 [redacted]
Probe and Sample Identification (field ID)		SER-SS-11-0217
Probe Installation	Date and time	1450
	Thickness of slab (inches)	5"
	Depth of hole drilled (inches below slab surface)	7"
	Total VOCs measure in hole with PID (ppmv)	0323
	Depth of installed probe (inches below slab surface)	NA
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1423
	Purge vacuum (" Hg)	0
	Purge completion time	1439
Water Dam Leak Check*	Leak check (pass or fail?)	Pass

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis MultiRAE PID	O2 (%)	19.5
	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.2 / 2409
Canister Sampling	Canister ID	AC02249
	Flow controller ID	FC00294
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	~~24hr~~ / 6L 22hr 49min
	Sample start date and time	1450 2/22/17
	Initial canister pressure (" Hg)	28.87
	Sampling vacuum (" Hg)	NA
	Sample completion date and time	1339 2/23/17
	Final canister pressure (" Hg)	-7.36

Weather conditions during sampling: Sunny, SW Windy 15-20 mph 30°

Observations and Comments:

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Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

Property ID	4
Sampling Period (8 or 24 hour?)	24hr
Sample Start Date	2/22/17
Sample End Date	2/23/17
Interior Temperature	75°

Sample ID	Location Description	Canister ID	Flow Controller ID	Sample Start Time	Initial Canister Pressure ("Hg)	Sample End Time	Final Pressure ("Hg)
SER-IA-07-0217	Basement next to TV/Den	AS00804	FCR00029	1454	-28.85	1336	5.76
SER-IA-07-0217-FD	Duplicate	AS00949	FCR00014	1454	-28.87	1336	6.52
SER-IA-08-0217	Living Room SE corner	AC01649	FCR00177	1501	-28.98	1335	-6.86
SER-OA-04-0217	Backyard on pool fence	AS-01220	FCR00277	1516	-28.37	1331	-6.09

June 2017

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JE Rockford — Project #: 678601 ET.01
Sampler Name: [redacted] — Date: 6/9/17

Structure

Identification: SS-04
Address: [redacted]
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install forms
Is water present in the soil?: See install forms

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SGP-SS-04-062017
Probe Installation	Date and time	
	Thickness of slab (inches)	/
	Depth of hole drilled (inches below slab surface)	see installation forms
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	/
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time (KM)	~~1140~~ 1208 ~~1155~~
	Purge vacuum (" Hg)	0
	Purge completion time (KM)	~~1200~~ 1213
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	18.0
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AC02198
	Flow controller ID	FCR00253
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hr 20mL/min
	Sample start date and time	6/9/17 @ 1213
	Initial canister pressure (" Hg)	-29.33
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/12/17 @ 1033
	Final canister pressure (" Hg)	-10.44

Weather conditions during sampling: ~75°F Sunny Outside

Observations and Comments: Had to re-purge due to loose nut.

Property 6 (Residential Property)

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 6/9/17

Structure

Identification: SS-05
Address: [redacted]
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install forms
Is water present in the soil? see install forms

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SS-05-062017
Probe Installation	Date and time	/
	Thickness of slab (inches)	see installation forms
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	/
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1140
	Purge vacuum (" Hg)	0
	Purge completion time	1144
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	19.0
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AS01170
	Flow controller ID	FCR001006
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hrs 9mn
	Sample start date and time	6/9/17@1215
	Initial canister pressure (" Hg)	-29.25
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/10/17@1024
	Final canister pressure (" Hg)	-12.25

Weather conditions during sampling: 75 F Sunny outside ~68F inside

Observations and Comments:

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Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

Property ID	[redacted]
Sampling Period (8 or 24 hour?)	24 HRS
Sample Start Date	6/9/17
Sample End Date	6/16/17
Interior Temperature	~68 F

Sample ID	Location Description	Canister ID	Flow Controller ID	Sample Start Time	Initial Canister Pressure ("Hg)	Sample End Time	Final Pressure ("Hg)
SER-CS-01-062017	east wall in basement	SSC00413	FCR00297	1215	-29.29	1025	-12.00
SER-CS-01-062017-FD	East wall in basement	A3005563	FCR00302	1215	-29.23	1025	-12.05
SER-IA-03-062017	basement	AS01038	FCR00231	1216	-29.30	1032	-11.09
SER-IA-03-062017-FD	~~kitchen on fridge~~ basement (FW)	AS00542	FCR0083	1216	-29.28	1032	-9.24
SER-IA-04-062017	kitchen on fridge	AS00879	FCR00~~216~~ 127 (E)	1219	-29.27	1039	11.92
SER-OA-01-062017	backyard near dog pen	AC02481	FCR00216	1236	-29.27	1042	-7.54

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 628601.ET.01
Sampler Name: [redacted]
Date: 6/7/17

Structure

Identification: SER-SS-06 (W)
Address: [redacted] Property 3
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install form
Is water present in the soil? see install form

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SS-06-062017
Probe Installation	Date and time	/
	Thickness of slab (inches)	/
	Depth of hole drilled (inches below slab surface)	see installation forms
	Total VOCs measure in hole with PID (ppmv)	see installation forms
	Depth of installed probe (inches below slab surface)	see installation forms /
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1646
	Purge vacuum (" Hg)	0
	Purge completion time	1652
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	19.1
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0
Canister Sampling	Canister ID	AC02102
	Flow controller ID	FCR00219
	Pressure gauge ID (optional)	— NA
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hrs 2 hrs
	Sample start date and time	6/7/17 @ 1741
	Initial canister pressure (" Hg)	-29.30
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1602
	Final canister pressure (" Hg)	-11.08

Weather conditions during sampling: 80 F Sunny Outside

Observations and Comments:

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 578601.ET.01
Sampler Name: [redacted]
Date: 6/7/17

Structure

Identification: SER-SS-07 (MA)
Address: [redacted] Aptg 3
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install form
Is water present in the soil? see install form

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SER-SS-07-062017+FD	
Probe Installation	Date and time	/
	Thickness of slab (inches)	/
	Depth of hole drilled (inches below slab surface)	see install forms
	Total VOCs measure in hole with PID (ppmv)	see install forms
	Depth of installed probe (inches below slab surface)	/
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1713
	Purge vacuum (" Hg)	0
	Purge completion time	1718
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	18.9
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AS00837 / AC02131 (FD)
	Flow controller ID	FCR00007 / FCR00055 (FD)
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 21h 27mm
	Sample start date and time	6/7/17 @ 1542
	Initial canister pressure (" Hg)	-29.39 / -29.29 (FD)
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1609
	Final canister pressure (" Hg)	-9.78 / -11.13 (FD)

Weather conditions during sampling: 80 F. Sunny outside

Observations and Comments: SER-SS-07-062017-FD

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601.ET.01
Sampler Name: [redacted]
Date: 6/7/17

Structure

Identification: SERSS-08 (FM)
Address: [redacted] Property 3
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install form
Is water present in the soil? see install form

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		[redacted]
Probe and Sample Identification (field ID)		SER-SS-08-062017
Probe Installation	Date and time	/
	Thickness of slab (inches)	
	Depth of hole drilled (inches below slab surface)	see installation forms
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	/
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1727
	Purge vacuum (" Hg)	0
	Purge completion time	1733
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	18.3
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AC01919
	Flow controller ID	FCR00189
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	24 HRS 22hrs 32mV
	Sample start date and time	6/7/17 @ 1743
	Initial canister pressure (" Hg)	-29.30
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1605
	Final canister pressure (" Hg)	-11.54

Weather conditions during sampling: 80°F Sunny outside

Observations and Comments:

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Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

Property ID	Property3
Sampling Period (8 or 24 hour?)	24 HRS
Sample Start Date	6/7/17
Sample End Date	6/8/17
Interior Temperature	~ 65°F

[redacted]

Sample ID	Location Description	Canister ID	Flow Controller ID	Sample Start Time	Initial Canister Pressure ("Hg)	Sample End Time	Final Pressure ("Hg)
SER-OA-03-062017	backyard	AC00714	FCA00774	1805	-29.29	1628	-2.64
SER-IA-05-062017	basement	AC01252	FCA00506	1744	-29.30	16:17	-10.93
SER-OA-03-062017-FD	backyard	SC01001	FCA0297	1805	-29.11	1628	-11.44
SER-IA-06-062017	living room	AS00816	FCA01062	1750	-29.29	1625	-11.15

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rock Ford
Project #: 678601 ET.01
Sampler Name: [redacted]
Date: 6/7/17

Structure

Identification: ~~Street~~ SS-09 Property 4
Address: [redacted]
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): see install forms
Is water present in the soil? see install forms

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SS-09-060217
Probe and Sample Identification (field ID)		[redacted]
Probe Installation	Date and time	
	Thickness of slab (inches)	see installation forms
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1355
	Purge vacuum (" Hg)	0
	Purge completion time	1402
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	17.6
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	AS01029
	Flow controller ID	FCR00230
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hr 27mn
	Sample start date and time	6/7/17 @ 1448
	Initial canister pressure (" Hg)	-29.27
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1315
	Final canister pressure (" Hg)	(10) / 11.0 analog/ digital

Weather conditions during sampling: Sunny 75 Inside ~62F

Observations and Comments: good - dried play-doh thin previous sampling

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info			
Project Name:	Property 4 SE Rockford	Project #:	678601 ET.01
Sampler Name:	[redacted]	Date:	6/7/17

Structure	
Identification:	SS-10
Address:	[redacted] property 4
Slab Information:	
Condition of slab	good
Describe material under the slab (gravel, sand, etc.)	see install forms
Is water present in the soil?	see install forms

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)	[redacted]	
Probe and Sample Identification (field ID)	SGR-SS-10-062017 Center	
Probe Installation	Date and time	/
	Thickness of slab (inches)	/
	Depth of hole drilled (inches below slab surface)	see installation forms
	Total VOCs measure in hole with PID (ppmv)	see installation forms
	Depth of installed probe (inches below slab surface)	see installation forms
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1436
	Purge vacuum (" Hg)	0
	Purge completion time	1491
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	18.1
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0
Canister Sampling	Canister ID	AS01016
	Flow controller ID	FCR 0293
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hr 17m
	Sample start date and time	6/7/17 @ 1448
	Initial canister pressure (" Hg)	-29.31
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1305
	Final canister pressure (" Hg)	(-2) / -3.01 analog / digital

Weather conditions during sampling: Sunny 75 F outside
N/a 2 inside

Observations and Comments: good

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Vapor Intrusion Best Practices
Subslab Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: SE Rockford
Project #: 678601 ET.01
Sampler Name: [redacted]
Date: 6/7/17

Structure

Identification: SS-11
Address: [redacted] Property 4
Slab Information:
Condition of slab: good
Describe material under the slab (gravel, sand, etc.): See install form
Is water present in the soil? see install form

Subslab Soil Gas Probe Installation, Probe Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		SE-SS-11-062017
Probe and Sample Identification (field ID)		basement / washer + dryer (west)
Probe Installation	Date and time	/
	Thickness of slab (inches)	see installation forms
	Depth of hole drilled (inches below slab surface)	
	Total VOCs measure in hole with PID (ppmv)	/
	Depth of installed probe (inches below slab surface)	
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	PASS
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1418
	Purge vacuum (" Hg)	0
	Purge completion time	1423
Water Dam Leak Check*	Leak check (pass or fail?)	PASS

* The subslab soil gas probe passes the water dam leak check if there are no bubbles observed and the water level doesn't drop within the water dam during purging. Do NOT collect a subslab soil gas sample if the probe fails the leak test.

Field Analysis (optional)	O2 (%)	17.5
MultiRae PID	CO (ppm)	0
	H2S (ppm)	0
	LEL (%)	0
	Total VOCs (ppm)	0.1
Canister Sampling	Canister ID	ACP2255
	Flow controller ID	FCR 00188
	Pressure gauge ID (optional)	—
	Sampling rate or period (mL/min or hours)	~~24 HRS~~ 22hr 21mn
	Sample start date and time	6/7/17 @ 1448
	Initial canister pressure (" Hg)	-29.25
	Sampling vacuum (" Hg)	0
	Sample completion date and time	6/8/17 @ 1309
	Final canister pressure (" Hg)	-(8) / -10.95 analog / digital

Weather conditions during sampling: Sunny 75 F outside
~62 F inside

Observations and Comments:

ch2m:

Vapor Intrusion Best Practices

Indoor, Outdoor, Crawlspace Air Sampling Log - Canister Method

Property ID	property #4
Sampling Period (8 or 24 hour?)	24 HRS
Sample Start Date	6/7/17
Sample End Date	6/8/17
Interior Temperature	~65°F

[redacted]

Sample ID	Location Description	Canister ID	Flow Controller ID	Sample Start Time	Initial Canister Pressure ("Hg)	Sample End Time	Final Pressure ("Hg)
~~SER-IA-07-062017~~	~~basement~~ Not Submitted	~~AS00530~~	~~FCA00952~~	~~1451~~	~~-29.26~~	~~1320~~	~~-9.08~~
SER-IA-07-062017 ~~-DS~~	basement	AS00575	FCR00294	1451	-29.30	1320	-11.05
SER-IA-08-062017	living room in front of bay wind.	AS00784	FCR00006	1455	-29.15	1330	-10.58
SER-OA-04-062017	backyard-swimming pool	AS01164	FCA01093	1505	-29.70	1338	-11.70

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Attachment 7
Waste Characterization Results and Disposal Documentation

Attachment 7 - Table 1. Solid Investigation Derived Waste Sampling Results - August 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	SER-IDW-01-0816 8/19/2016
TCLP Volatile Organic Compounds		
Benzene	ug/L	20 U
2-Butanone	ug/L	100 U
Carbon tetrachloride	ug/L	20 U
Chlorobenzene	ug/L	20 U
Chloroform	ug/L	20 U
1,2-Dichloroethane	ug/L	20 U
1,1-Dichloroethene	ug/L	20 U
Tetrachloroethene	ug/L	20 U
Trichloroethylene	ug/L	20 U
Vinyl Chloride	ug/L	20 U
TCLP Semivolatile Organic Compounds		
1,4-Dichlorobenzene	ug/L	100 U
2,4-Dinitrotoluene	ug/L	100 U
Hexachlorobenzene	ug/L	100 U
Hexachlorobutadiene	ug/L	100 U
Hexachloroethane	ug/L	100 U
3-Methylphenol	ug/L	100 U
Nitrobenzene	ug/L	100 U
Pentachlorophenol	ug/L	100 U
Pyridine	ug/L	200 U
2,4,5-Trichlorophenol	ug/L	100 U
2,4,6-Trichlorophenol	ug/L	100 U
TCLP Pesticides		
gamma-BHC (Lindane)	ug/L	0.05 U
Chlordane	ug/L	2.5 U
Endrin	ug/L	0.1 U
Heptachlor	ug/L	0.05 U
Heptachlor Epoxide	ug/L	0.05 U
Methoxychlor	ug/L	0.2 U
Chlorinated Camphene	ug/L	10 U
TCLP Herbicides		
2,4-Dichlorophenoxyacetic acid	ug/L	5 U
Silvex (2,4,5-TP)	ug/L	5 U
Polychlorinated Biphenyls		
Aroclor 1016	ug/kg	93 U
Aroclor 1221	ug/kg	93 U
Aroclor 1232	ug/kg	93 U
Aroclor 1242	ug/kg	93 U
Aroclor 1248	ug/kg	93 U
Aroclor 1254	ug/kg	93 U
Aroclor 1260	ug/kg	93 U
Total PCBs	ug/kg	93 U

Attachment 7 - Table 1. Solid Investigation Derived Waste Sampling Results - August 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	SER-IDW-01-0816 8/19/2016
TCLP Metals		
Arsenic	mg/L	0.05 U
Barium	mg/L	**0.71**
Cadmium	mg/L	**0.00052 J**
Chromium	mg/L	0.05 U
Lead	mg/L	0.05 U
Selenium	mg/L	0.05 U
Silver	mg/L	0.05 U
Mercury	mg/L	0.002 U
Wet Chemistry		
Flash Point	deg f	**>200**
Moisture, percent	Percent	**10**
pH	pH UNITS	**8.2**

ug/L= micrograms per liter

ug/kg = micrograms per kilogram

mg/L = milligrams per liter

deg f = degrees fahrenheit

pH units = standard pH units

TCLP = toxicity characteristic leaching procedure

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Detected results are bolded

Attachment 7 - Table 2. Aqueous Investigation Derived Waste Sampling Results - August 2016

Southeast Rockford Groundwater Contamination Superfund Site - Rockford, IL

Compound	Units	SER-IDW-02-0816 8/19/2016
Volatile Organic Compounds		
Benzene	ug/l	20 U
2-Butanone	ug/l	100 U
Carbon tetrachloride	ug/l	20 U
Chlorobenzene	ug/l	20 U
Chloroform	ug/l	20 U
1,2-Dichloroethane	ug/l	20 U
1,1-Dichloroethene	ug/l	20 U
Tetrachloroethene	ug/l	20 U
Trichloroethylene	ug/l	20 U
Vinyl Chloride	ug/l	20 U
Semivolatile Organic Compounds		
1,4-Dichlorobenzene	ug/l	20 U
2,4-Dinitrotoluene	ug/l	5.4 U
Hexachlorobenzene	ug/l	5.4 U
Hexachlorobutadiene	ug/l	5.4 U
Hexachloroethane	ug/l	5.4 U
2-Methylphenol	ug/l	5.4 U
3- & 4-Methylphenol	ug/l	5.4 U
Nitrobenzene	ug/l	5.4 U
Pentachlorophenol	ug/l	5.4 U
Pyridine	ug/l	11 U
2,4,5-Trichlorophenol	ug/l	5.4 U
2,4,6-Trichlorophenol	ug/l	5.4 U
Pesticides		
gamma-BHC (Lindane)	ug/l	0.05 U
Chlordane	ug/l	2.5 U
Alpha-Chlordane	ug/l	0.1 U
trans-Chlordane	ug/l	0.1 U
Endrin	ug/l	0.1 U
Heptachlor	ug/l	0.05 U
Heptachlor Epoxide	ug/l	0.05 U
Methoxychlor	ug/l	0.2 U
Chlorinated Camphene	ug/l	10 U
Herbicides		
2,4-Dichlorophenoxyacetic acid	ug/l	2 U
Silvex (2,4,5-TP)	ug/l	2 U
RCRA Metals		
Arsenic	mg/l	**0.027**
Barium	mg/l	**0.65**
Cadmium	mg/l	**0.0069**
Chromium	mg/l	**0.32**
Lead	mg/l	**0.046**
Selenium	mg/l	**0.0082**
Silver	mg/l	**0.00033 J**
Mercury	mg/l	0.001 U
Wet Chemistry		
Flash Point	deg f	**>200**
pH	pH UNITS	**9.6**

ug/l = micrograms per liter

mg/l = milligrams per liter

deg f = degrees fahrenheit

pH units = standard pH units

J = Estimated: The analyte was positively identified; the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria.

U = Undetected: The analyte was analyzed for, but not detected above the reported sample quantitation limit.

Detected results are bolded.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
WID986100047	1	800-424-9300	101116USEPA

GENERATOR

5. Generator's Name and Mailing Address
USEPA Region V
2613 S. 11th Street
Rockford IL 61109
Attn Timothy Drexler
Generator's Phone: 312 353 4367

Generator's Site Address (if different than mailing address)
USEPA Region V
2630 Marshall Street
Rockford IL 61109

6. Transporter 1 Company Name
Badger Disposal of WI, Inc.
U.S. EPA ID Number
WID988580056

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Badger Disposal of WI, Inc.
5611 West Hemlock Street
Milwaukee WI 53223
Facility's Phone: 414 760 9175
U.S. EPA ID Number
WID988580056

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-regulated material	001	DM	060	P	NONE
	2. Non-regulated material	002	DM	600	P	NONE
	3. Non-regulated material	001	DM	250	P	NONE
	4.					

13. Special Handling Instructions and Additional Information
1)(S)WS046781 PPE 2)WS046784 IDW Soil 3)(L)WS046780 IDW Water Emergency Contact: CHEMTREC #CCN708044

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Karen Kuchner
Signature: Karen Kuchner
Month 10 Day 11 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Jeff Foss
Signature:
Month 10 Day 11 Year 16
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name:
Signature:
Month Day Year

6-NHM-C-C-11

6-GENERATOR'S INITIAL COPY

Attachment 8
Data Quality Evaluation Memorandums

Analytical Data Summary for Vapor Intrusion Sampling at the Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois

PREPARED FOR:	U.S. Environmental Protection Agency (EPA)
PREPARED BY:	CH2M HILL (CH2M)
DATE:	August 17, 2017

This memorandum presents the data quality evaluation (DQE) of indoor air (IA), outdoor air (OA), crawl space (CS), subslab soil gas (SS) and exterior soil gas (SG) samples collected during the field investigation conducted August 8-19, 2016; November 28 through December 1, 2016; February 15-23, 2017 and June 7-10, 2017 at the Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois.

The objective of this investigation is detailed in the *Uniform Federal Policy Quality Assurance Project Plan (QAPP)—Addendum I* (CH2M 2015); *QAPP Addendum II* (CH2M 2016) and *QAPP Addendum III* (CH2M 2017). Guidance for the data quality evaluation assessment followed the *Quality Assurance Project Plan Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois* (CH2M 2014); EPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA 2016, 2017) and individual method requirements.

The sampling was performed by CH2M. The analyses were performed by ALS in Simi Valley, California. The samples were reported in six sample delivery groups (SDGs) listed as P1604080, P1605567, P1605590, P1700923, P1702791 and P1702846. The analytical results were evaluated using the criteria of precision, accuracy, representativeness, comparability, and completeness (PARCC), as described in the *QAPP* and *QAPP Addendum I.* This technical memorandum summarizes the data issues identified during the general data quality assessment.

Analytical Data

This DQE report provides the results and validation for 14 normal SS samples, 24 normal SG samples; 15 IA samples; 9 outdoor OA samples; 3 CS samples; 4 SS field duplicates (FDs), 2 SG FDs; 4 IA FDs; 4 OA FDs and 3 CS FDs collected and analyzed for site-specific volatile organic compounds by Methods TO-15 (IA, OA, and CS samples) and TO-15 SIM (SS and SG samples). Samples were shipped by an overnight carrier to the laboratory for analysis.

Stage 2B validation (Level III) was performed on one hundred percent of the data to assess their analytical accuracy, precision, and completeness. The assessment of the data included a review of the following:

- Completeness
- Chain-of-custody documentation
- Holding times and sample receipt conditions

- Frequency of QC samples
- Initial calibration and continuing calibration precision and accuracy
- Blank contamination and, if any, its impact on the analytical results
- Laboratory control sample (LCS) accuracy
- Surrogate spike accuracy
- Internal standard accuracy and frequency
- Instrument tuning accuracy and frequency
- Laboratory and FD precision

In addition, a Stage 3 validation (Level IV) was performed on 10 percent of the data to verify identification of the analytes by reviewing the raw instrument data and to check the calculations of the sample and QC concentrations.

The QA/QC criteria implemented during validation were those listed in the site-specific QAPP and subsequent addendums. Standard data qualifiers were added as a means of classifying the data as to their conformance to QA/QC requirements. Multiple qualifiers are routinely applied to specific sample method/matrix/analyte combinations, but there is only one final qualifier. A final qualifier is applied to the data and is the most conservative of the applied validation qualifiers. The data qualifiers are defined as follows:

[R] The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.

[U] Undetected. The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

[J] Estimated. The analyte was positively identified; the concentration is an estimation due to discrepancies in meeting certain analyte-specific QC criteria or was reported between the detection limit and reporting limit.

[UJ] The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC.

[UB] Undetected due to blank contamination. The analyte was detected in the sample and in an associated method, field, or trip blank. The analyte concentration is potentially the result of contamination.

In instances where multiple analyses were performed, the analytical run with the lowest reporting limits was used if the QC criteria were met for that analysis. If a sample was analyzed more than once due to a target parameter concentration above the calibration range, the results for all parameters were reported from the lowest dilution, except for the parameters exceeding the calibration range, which were reported from the diluted analysis. In instances where multiple analyses were performed with QC outside criteria, the analytical run with the least number of exceptions or best possible QC was chosen for reporting purposes.

The analytical results were within project control limits, except where noted in the following sections. Qualified data are listed in Table 1.

Soil Gas Samples

Holding Time and Preservation

Acceptance criteria were met.

Calibration

Initial and continuing calibration analyses were performed as required by the methods, and acceptance criteria were met.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination.

Laboratory Control Samples

LCS/LCSDs were analyzed as required, and acceptance criteria were met with the following exception:

- Toluene was recovered greater than the upper control limit in one LCS associated with Method TO-15, indicating a possible high bias. The data were qualified as estimated detected results and flagged "J" in the associated samples.

Surrogate Standards

Surrogates were added to the samples, and acceptance criteria were met.

Internal Standards

Internal standards were added as required, and acceptance criteria were met.

Instrument Tunes

Instrument tunes were completed as required, and acceptance criteria were met.

Laboratory Duplicates

Laboratory duplicates were performed as required, and precision criteria were met.

Field Duplicates

FDs were collected and analyzed as required, and the relative percent differences (RPDs) were within established QC limits.

Indoor Air, Outdoor Air and Crawl Space

Holding Time and Preservation

Acceptance criteria were met.

Calibration

Initial and continuing calibration analyses were performed as required by the methods, and acceptance criteria were met.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination.

Laboratory Control Samples

LCS/LCSDs were analyzed as required, and acceptance criteria were met with the following exceptions:

- Several analytes were recovered greater than the upper control limit in one LCS/LCSD associated with Method TO-15 SIM, indicating a possible high bias. Detected results were qualified as estimated and flagged "J" in the associated samples. Non-detected results were not qualified.

Surrogate Standards

Surrogates were added to the samples, and acceptance criteria were met.

Internal Standards

Internal standards were added as required, and acceptance criteria were met.

Instrument Tunes

Instrument tunes were completed as required, and acceptance criteria were met.

Laboratory Duplicates

Laboratory duplicates were performed as required, and precision criteria were met.

Field Duplicates

FDs were collected and analyzed as required, and the relative percent differences (RPDs) were within established QC limits with the following exceptions:

- The RPD for dichloromethane exceeded criteria in FD pair SER-IA-07-0217/ SER-IA-07-0217-FD for Method TO-15 SIM. The data were qualified as estimated and flagged "J" in the FD pair.
- The RPDs for multiple analytes exceeded criteria in FD pairs SER-IA-03-062017/SER-IA-03-062017-FD and SER-OA-03-062017/SER-OA-03-062017-FD. The data were qualified as estimated and flagged "J" in the respective FD pair.

Level IV Validation

Level IV validation was performed on 10% of the samples by CH2M. No additional issues were noted during the Level IV review. The reports can be found in **Attachment B**.

Overall Assessment

The goal of this assessment is to document that a sufficient number of representative samples were collected, and the resulting analytical data can be used to support the decision-making process.
The following summary highlights the PARCC findings for the sampling events:

- Precision of the data was verified through the review of the field and laboratory data quality indicators that include FD and LCS/LCSD RPDs. Precision was generally acceptable except for several analytes which were qualified as estimated in six samples due to FD RPD issues. Data users should consider the impact to results that are qualified as estimated, because it may indicate a bias that could affect the decision making process.

- Accuracy of the data was verified through the review of the calibration data, LCS/LCSD, surrogate, and internal standard recoveries, as well as the evaluation of the method blank data. Accuracy was generally acceptable except for a few analytes which were qualified as estimated in several samples associated with Methods TO-15 and TO-15 SIM due to LCS/LCSD issues. In addition, a few analytes were qualified as not detected due to method blank contamination in multiple samples associated with Method TO-15.
- Representativeness of the data was verified through the sample's collection, storage, and preservation procedures, and verification of holding-time compliance. The laboratory did not note discrepancies with sample collection, storage, or preservation procedures. The data were reported from analyses within the EPA recommended holding time.
- Comparability of the data was verified through the use of standard EPA analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are defined as the data that are not rejected for project use. The data were considered valid, and the completeness goal of 90 percent was met for the analyte/method combinations.

References

CH2M HILL (CH2M). 2017. *Quality Assurance Project Plan Addendum III, Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois.* January.

CH2M HILL (CH2M). 2016. *Quality Assurance Project Plan Addendum II, Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois.* July.

CH2M HILL (CH2M). 2015. *Quality Assurance Project Plan Addendum I, Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois.* July.

CH2M HILL (CH2M). 2014. *Quality Assurance Project Plan, Southeast Rockford Groundwater Contamination Superfund Site, Winnebago County, Illinois.* January.

U.S. Environmental Protection Agency (EPA). 2014. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. August.

Table 1. Data Qualification Summary

Location Identification	Scribe Sample Identification	Analytical Method	Analyte	Result	Unit	Validation Flag	Validation Reason
SER-SG-75-0816	16CR03-18	TO15	Toluene	1300	ug/m3	J	LCS>UCL
SER-SG-76-0816	16CR03-19	TO15	Toluene	370	ug/m3	J	LCS>UCL
SER-SG-77-0816	16CR03-20	TO15	Toluene	30	ug/m3	J	LCS>UCL
SER-SG-78-0816	16CR03-21	TO15	Toluene	160	ug/m3	J	LCS>UCL
SER-SG-80-0816	16CR03-23	TO15	Toluene	2300	ug/m3	J	LCS>UCL
SER-SG-76-0816-FD	16CR03-24	TO15	Toluene	380	ug/m3	J	LCS>UCL
SER-IA-05-0217	17CR01-32	TO15SIM	Trichloroethylene	0.22	ug/m3	J	LCS>UCL
SER-IA-05-0217	17CR01-32	TO15SIM	Xylene, o	4	ug/m3	J	LCSD>UCL
SER-IA-06-0217	17CR01-33	TO15SIM	Trichloroethylene	0.65	ug/m3	J	LCS>UCL
SER-IA-06-0217	17CR01-33	TO15SIM	Xylene, o	6.5	ug/m3	J	LCSD>UCL
SER-OA-03-0217	17CR01-34	TO15SIM	Trichloroethylene	0.029	ug/m3	J	LCS>UCL
SER-OA-03-0217	17CR01-34	TO15SIM	Xylene, o	0.17	ug/m3	J	LCSD>UCL
SER-OA-03-0217-FD	17CR01-35	TO15SIM	Trichloroethylene	0.038	ug/m3	U	LCS>UCL
SER-OA-03-0217-FD	17CR01-35	TO15SIM	Xylene, o	0.16	ug/m3	J	LCSD>UCL
SER-IA-07-0217	17CR01-39	TO15SIM	Dichloromethane	0.72	ug/m3	J	FD>RPD
SER-IA-07-0217	17CR01-39	TO15SIM	Trichloroethylene	0.017	ug/m3	J	LCS>UCL
SER-IA-07-0217	17CR01-39	TO15SIM	Xylene, o	0.6	ug/m3	J	LCSD>UCL
SER-IA-07-0217-FD	17CR01-40	TO15SIM	1,1,1-Trichloroethane	0.023	ug/m3	J	LCS>UCL
SER-IA-07-0217-FD	17CR01-40	TO15SIM	Benzene	0.77	ug/m3	J	LCS>UCL
SER-IA-07-0217-FD	17CR01-40	TO15SIM	Dichloromethane	0.51	ug/m3	J	FD>RPD
SER-IA-07-0217-FD	17CR01-40	TO15SIM	Trichloroethylene	0.018	ug/m3	J	LCS>UCL
SER-IA-08-0217	17CR01-41	TO15SIM	1,1,1-Trichloroethane	0.021	ug/m3	J	LCS>UCL
SER-IA-08-0217	17CR01-41	TO15SIM	Benzene	0.81	ug/m3	J	LCS>UCL
SER-IA-08-0217	17CR01-41	TO15SIM	Trichloroethylene	0.017	ug/m3	J	LCS>UCL
SER-OA-04-0217	17CR01-42	TO15SIM	1,1,1-Trichloroethane	0.023	ug/m3	J	LCS>UCL
SER-OA-04-0217	17CR01-42	TO15SIM	Benzene	0.49	ug/m3	J	LCS>UCL
SER-OA-03-062017	17CR01-49	TO15SIM	1,2-Dichloroethane	0.053	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Benzene	0.3	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Dichloromethane	0.3	ug/m3	J	FD>RPD

Table 1. Data Qualification Summary

Location Identification	Scribe Sample Identification	Analytical Method	Analyte	Result	Unit	Validation Flag	Validation Reason
SER-OA-03-062017	17CR01-49	TO15SIM	Ethylbenzene	0.23	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Tetrachloroethene	0.17	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Toluene	1.4	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Xylene, o	0.31	ug/m3	J	FD>RPD
SER-OA-03-062017	17CR01-49	TO15SIM	Xylenes, m & p	0.69	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	1,2-Dichloroethane	0.091	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Benzene	0.47	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Dichloromethane	0.68	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Ethylbenzene	1.1	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Tetrachloroethene	0.25	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Toluene	5.5	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Xylene, o	1.7	ug/m3	J	FD>RPD
SER-OA-03-062017-FD	17CR01-50	TO15SIM	Xylenes, m & p	3.3	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Benzene	1	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Ethylbenzene	0.69	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Tetrachloroethene	0.38	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Toluene	3.4	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Xylene, o	0.79	ug/m3	J	FD>RPD
SER-IA-03-062017	17CR01-62	TO15SIM	Xylenes, m & p	2.3	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Benzene	1.8	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Ethylbenzene	1.9	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Tetrachloroethene	0.52	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Toluene	8.6	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Xylene, o	2	ug/m3	J	FD>RPD
SER-IA-03-062017-FD	17CR01-65	TO15SIM	Xylenes, m & p	5.3	ug/m3	J	FD>RPD

Validation Reasons:

FD>RPD	The RPD exceeded criteria in the FD pair
LCS>UCL	The laboratory control sample was recovered greater than the upper control limit
LCSD>UCL	The laboratory control sample duplicate was recovered greater than the upper control limit

Level IV Validation Fields

Initial and Continuing Calibration Worksheets - VOC-SIM

SDG Number: **P1604080**

Initial Calibration Curve Calculations

Formula for Calculation of Relative Response Factors (RRF)

$$\frac{\text{Area}_X}{\text{Area}_{IS}} \text{ multiplied by } \frac{\text{Amount}_{IS}}{\text{Amount}_X} = \textbf{RRF}$$

where:

Area_X = Area of the characteristic ion for the compound to be measured
Area_{IS} = Area of the characteristic ion for the referenced Internal Standard
Amount_{IS} = Amount of Internal Standard added
Amount_X = Amount of compound added

Formula for Calculation of Relative Standard Deviation (%RSD)

$$\frac{\text{Standard Deviation of RRFs of } X}{\text{Average RRF}_X} \text{ multiplied by } 100 = \textbf{\%RSD}$$

Instrument:		**Date**:	**Time**	
MS19		7/7/2016		
Tetrachloroethene	referenced to:	1,4-Difluoroethene		
			NR	**RRF 9.9**
			0.284	**RRF 19.8**
1703		1000	0.275	**RRF 49.5**
68799		99		
	Calc RRF	**0.250**	0.250	**RRF 99**
			0.267	**RRF 495**
			0.292	**RRF 990**
			0.264	**RRF 1980**
			0.258	**RRF 4950**
			0.259	**RRF 9900**
			0.269	**RRF 49500**
Standard Deviation =	0.0132288			
Average RRF =	0.269	**Laboratory AVG RRF =**	0.269	
		OK?	**Yes**	
% RSD =	4.92	**Laboratory %RSD =**	4.92	
		OK?	**Yes**	

Initial and Continuing Calibration Worksheets - VOC-SIM

SDG Number: **P1604080**

Continuing Calibration Curve Calculations

Formula for Calculation of Relative Response Factors (RRF)

$$\frac{Area_X}{Area_{IS}} \text{ multiplied by } \frac{Amount_{IS}}{Amount_X} = \textbf{RRF}$$

where:

$Area_X$ = Area of the characteristic ion for the compound to be measured
$Area_{IS}$ = Area of the characteristic ion for the referenced Internal Standard
$Amount_{IS}$ = Amount of Internal Standard added
$Amount_X$ = Amount of compound added

CCAL Filename:		**Date/Time**:		
08251604.D		8/25/16 0843		
Tetrachloroethene	referenced to:	1,4-Difluoroethene		
9953 / 73836		1000 / 495	**CCAL RRF=**	0.272
			Laboratory CCAL RRF =	0.272

Formula for Calculation of percent Difference (%D)

$$\frac{ICAL\ AVG\ RRF - CCAL\ RRF}{ICAL\ AVG\ RRF} \text{ multiplied by } 100 = \textbf{\%D}$$

Where:
ICAL AVG RRF = The average relative response factor from the curve
CCAL RRF = The Relative Response Factor from the continuing calibration verification run daily

%D =		-1.2
Laboratory %D =	1.1	
OK?	**Yes**	

Comment: Difference due to rounding.

Sample Compound Concentrations - VOC-SIM

SDG Number: **P1604080**

Formula for Calculation of Concentrations **Air**

$$\frac{(Area_X)\,(Mass_{IS})\,(Df)}{(Area_{IS})\,(RRF_X)} = \text{Mass in pg}$$

where:

$Area_X$ = Area of the characteristic ion for the compound to be measured
$Area_{IS}$ = Area of the characteristic ion for the referenced Internal Standard
$Mass_{IS}$ = Mass of Internal Standard added (pg)
RRF_X = AveragevRRF of compound from initial calibration curve
DF = Dilution Factor

$$\frac{\text{(Mass in pg)}}{\text{(Injection Volume in L) (1000)}} = \text{Concentration in ng/L} = \text{Concentration in ug/m3}$$

where:
1000 is conversion from pg to ng

Sample ID: **Air**
P1604080-005

	Toluene
On-Column Mass =	3244.6
$Area_x$ =	220800
$Area_{IS}$ =	72975
$Mass_{IS}$	1000
RRF_X =	0.933
Conversion Factor =	1000
DF =	1.68

Compound(s)	Lab Conc in ug/m3	Calc Concentration in ug/m3	Lab Mass in pg	Calc Mass in pg
Toluene	5.50	5.45	NR	5448

Concentrations agree within 2% ? **Yes**

Comment:

NR: Not reported

Surrogate Recoveries - VOC-SIM

SDG Number: **P1604080**

Formula for Calculation of Surrogate Recovery

$$\text{\% Recovery} = \frac{\text{Concentration or amount found}}{\text{Concentration or amount spiked}} \times 100$$

Sample ID:
P1604080-007

	Surrogate	Amt/Conc found	Amount/Conc spiked	% Rec	Lab %REC	OK?
1	Bromofluorobenzene	1017.4	1000	102	102	**Yes**
2	1,2-Dichloroethane-d4	904.70	1000	90	91	**Yes**
3	Toluene-d8	972.88	1000	97	97	**Yes**

Comment:

LCS/LCSD Recoveries - VOC-SIM

SDG Number: **P1604080**

Formula for Calculation of LCS and LCSD Recovery

% Recovery = $\frac{\text{Concentration or amount found}}{\text{Concentration or amount spiked}} \times 100$

LCS Sample ID: P160825-DLCS

LCS Sample ID:

	Compound	Conc found	Conc spiked	% Rec	Lab %REC	OK?
LCS #1	Vinyl Chloride	3.16	4.00	79	79	**Yes**
LCSD #1	Vinyl Chloride	3.18	4.00	80	80	**Yes**
LCS #2	cis-1,2-Dichloroethene	3.51	4.36	81	81	**Yes**
LCSD #2	cis-1,2-Dichloroethene	3.52	4.36	81	81	**Yes**
LCS #3	Benzene	4.68	4.52	104	104	**Yes**
LCSD #3	Benzene	3.97	4.52	88	88	**Yes**

Formula for Calculation of Relative Percent Difference

Relative Percent Difference = $\frac{|\text{LCSR} - \text{LCSDR}|}{(1/2)(\text{LCSR} + \text{LCSDR})} \times 100$

where:

LCSR = Laboratory Control Spike Recovery
LCSDR = Laboratory Control Spike Duplicate Recovery

	Compound(s)	RPD	Lab RPD	OK?
1	Vinyl Chloride	1	1	**Yes**
2	cis-1,2-Dichloroethene	0	0	**Yes**
3	Benzene	16	17	**Yes**

Comment:

Duplicate Precision Recoveries - VOC-SIM

SDG Number: **P1604080**

Formula for Calculation of Relative Percent Difference

$$\text{Relative Percent Difference} = \frac{|\ MSR - MSDR\ |}{(1/2)\ (\ MSR + MSDR\ )} \times 100$$

where:

MSR = Matrix Spike Recovery
MSDR = Matrix Spike Duplicate Recovery

Sample ID:		**Compound**	
P1604080-004		Trichloroethene	
Sample		**Duplicate**	
Sample Concentration =	116.72	Duplicate Concentration =	117.33

Compound(s)	RPD (Conc)	Lab RPD	OK?
Trichloroethene	0.5	NR	**Yes**

Comment:

Initial and Continuing Calibration Worksheets - VOC

SDG Number: **P1604080**

Initial Calibration Curve Calculations

Formula for Calculation of Relative Response Factors (RRF)

$$\frac{\text{Area}_X}{\text{Area}_{IS}} \text{ multiplied by } \frac{\text{Amount}_{IS}}{\text{Amount}_X} = \textbf{RRF}$$

where:

Area_X = Area of the characteristic ion for the compound to be measured
Area_{IS} = Area of the characteristic ion for the referenced Internal Standard
Amount_{IS} = Amount of Internal Standard added
Amount_X = Amount of compound added

Formula for Calculation of Relative Standard Deviation (%RSD)

$$\frac{\text{Standard Deviation of RRFs of}_X}{\text{Average RRF}_X} \text{ multiplied by } 100 = \textbf{\%RSD}$$

Instrument: MS08 | **Date**: 8/9/2016 | **Time**

1,1-Dichloroethane	referenced to:	Bromochloromethane		ng / pg
			1.728	**RRF 0.08 / 83.2**
			1.727	**RRF 0.10 / 104**
11802		12.5	1.653	**RRF 0.20 / 208**
208811		0.416		
	Calc RRF	**1.698**	1.698	**RRF 0.40 / 416**
			1.780	**RRF 1.0 / 1040**
			1.742	**RRF 5.0 / 5200**
			1.918	**RRF 25 / 26000**
			1.813	**RRF 50 / 52000**
			1.690	**RRF 100 / 104000**
Standard Deviation =	0.0789643			
Average RRF =	1.750	**Laboratory AVG RRF =**	1.750	
		OK?	**Yes**	
% RSD =	4.51	**Laboratory %RSD =**	4.51	
		OK?	**Yes**	

Initial and Continuing Calibration Worksheets - VOC

SDG Number: **P1604080**

Continuing Calibration Curve Calculations

Formula for Calculation of Relative Response Factors (RRF)

$$\frac{\text{Area}_X}{\text{Area}_{IS}} \text{ multiplied by } \frac{\text{Amount}_{IS}}{\text{Amount}_X} = \textbf{RRF}$$

where:

Area_X = Area of the characteristic ion for the compound to be measured
Area_{IS} = Area of the characteristic ion for the referenced Internal Standard
Amount_{IS} = Amount of Internal Standard added
Amount_X = Amount of compound added

CCAL Filename:		**Date/Time**:		
08231601.D		8/23/16 0330		
1,1-Dichloroethane	referenced to:	Bromochloromethane		
563948		12.5	**CCAL RRF=**	1.690
160417		26		
			Laboratory CCAL RRF =	1.690

Formula for Calculation of percent Difference (%D)

$$\frac{\text{ICAL AVG RRF} - \text{CCAL RRF}}{\text{ICAL AVG RRF}} \text{ multiplied by } 100 = \textbf{\%D}$$

Where:
ICAL AVG RRF = The average relative response factor from the curve
CCAL RRF = The Relative Response Factor from the continuing calibration verification run daily

%D =		3.4
Laboratory %D =		3.4
OK?		**Yes**

Comment:

Sample Compound Concentrations - VOC

SDG Number: **P1604080**

Formula for Calculation of Concentrations **Air**

$$\frac{(Area_X)\,(Mass_{IS})\,(Df)}{(Area_{IS})\,(RRF_X)} = \text{Mass in pg}$$

where:

$Area_X$ = Area of the characteristic ion for the compound to be measured
$Area_{IS}$ = Area of the characteristic ion for the referenced Internal Standard
$Mass_{IS}$ = Mass of Internal Standard added (pg)
RRF_X = AveragevRRF of compound from initial calibration curve
DF = Dilution Factor

$$\frac{\text{(Mass in pg)}}{\text{(Injection Volume in L) (1000)}} = \text{Concentration in ng/L} = \text{Concentration in ug/m3}$$

where:
1000 is conversion from pg to ng

Sample ID: **Air**
P1604080-003

	1,1,-Dichloroethane
On-Column Mass =	89.47
$Area_x$ =	1955310
$Area_{IS}$ =	156106
$Mass_{IS}$	12.5
RRF_X =	1.690
Conversion Factor =	1
DF =	1.8

Compound(s)	Lab Conc in ug/m3	Calc Concentration in ug/m3	Lab Mass in pg	Calc Mass in pg
1,1,-Dichloroethane	160	167	NR	

Concentrations agree within 2% ? **Yes**

Comment: Differences due to rounding

NR: Not reported

Sample Compound Concentrations - VOC- #2

SDG Number: **P1604080**

SDG if Different	
Sample ID	**P1604080-001**
Date Analyzed	8/23/16 1257
Matrix	Air
Compound	1,1,1-Trichloroethane
IS	1,4-Difluorobenzene
Amount$_X$ (ppbv) =	71.434
Area$_X$ =	1193787
Area$_{IS}$ =	593744
Conc$_{IS}$ =	12.5
RRF$_X$ =	0.352
DF =	1.5
Calculated Concentration (ug/m3)	107
Reported Concentration (ug/m3)	110
OK?	**Yes**

Comment: Difference due to rounding

Surrogate Recoveries - VOC

SDG Number: **P1604080**

Formula for Calculation of Surrogate Recovery

$$\text{\% Recovery} = \frac{\text{Concentration or amount found}}{\text{Concentration or amount spiked}} \times 100$$

Sample ID:
P1604080-018

	Surrogate	Amt/Conc found	Amount/Conc spiked	% Rec	Lab %REC	OK?
1	Bromofluorobenzene	11.4	12.5	91	91	**Yes**
2	1,2-Dichloroethane-d4	13.80	12.5	110	110	**Yes**
3	Toluene-d8	12.09	12.5	97	97	**Yes**

Comment:

LCS/LCSD Recoveries - VOC

SDG Number: **P1604080**

Formula for Calculation of LCS and LCSD Recovery

% Recovery = $\frac{\text{Concentration or amount found}}{\text{Concentration or amount spiked}} \times 100$

LCS Sample ID: P160823-DLCS

LCS Sample ID:

	Compound	Conc found	Conc spiked	% Rec	Lab %REC	OK?
LCS #1	Vinyl Chloride	170	200	85	85	**Yes**
LCSD #1	Vinyl Chloride	171	200	86	86	**Yes**
LCS #2	1,1,1-Trichloroethane	189	210	90	90	**Yes**
LCSD #2	1,1,1-Trichloroethane	193	210	92	92	**Yes**
LCS #3	Benzene	179	226	79	79	**Yes**
LCSD #3	Benzene	182	226	81	81	**Yes**

Formula for Calculation of Relative Percent Difference

Relative Percent Difference = $\frac{|\text{LCSR} - \text{LCSDR}|}{(1/2)(\text{LCSR} + \text{LCSDR})} \times 100$

where:

LCSR = Laboratory Control Spike Recovery
LCSDR = Laboratory Control Spike Duplicate Recovery

	Compound(s)	RPD	Lab RPD	OK?
1	Vinyl Chloride	1	1	**Yes**
2	1,1,1-Trichloroethane	2	2	**Yes**
3	Benzene	2	3	**Yes**

Comment:

Duplicate Precision Recoveries - VOC

SDG Number: **P1604080**

Formula for Calculation of Relative Percent Difference

$$\text{Relative Percent Difference} = \frac{|\text{MSR} - \text{MSDR}|}{(1/2)(\text{MSR} + \text{MSDR})} \times 100$$

where:

MSR = Matrix Spike Recovery
MSDR = Matrix Spike Duplicate Recovery

Sample ID: NR

Compound

Sample	**Duplicate**
Sample Concentration =	Duplicate Concentration =

Compound(s)	**RPD (Conc)**	**Lab RPD**	**OK?**

Comment:

NR: Not reported